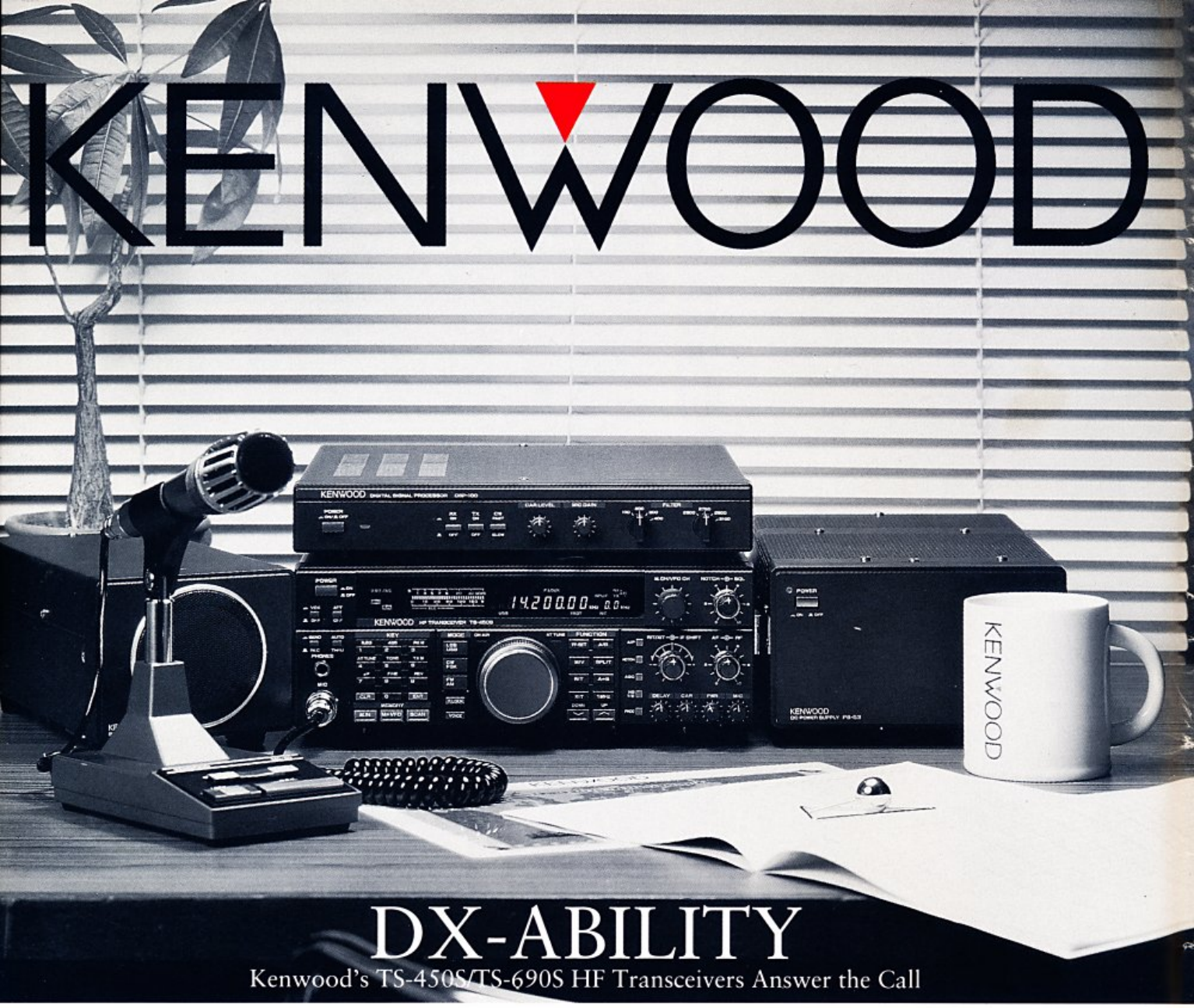
AMATEUR RADIO

RNARS Club Station VK2CC

JANUARY 1992 RRP $3.25

THE WIA RADIO AMATEUR'S JOURNAL



DX-ABILITY

Kenwood's TS-450S/TS-690S HF Transceivers Answer the Call

Wherever you are, whatever the situation, you can always count on Kenwood's TS-450S and TS-690S for tough, dependable performance. Products of world-famous Kenwood engineering, these versatile HF transceivers are designed for SSB, CW, AM, FM and FSK modes of operation on all Amateur bands, including the WARC bands. To further enhance capabilities, choose the optional DSP-100 Digital Signal Processor. The AT-450 Automatic Antenna Tuner is built into the TS-450S, and is available as an internal option for the TS-690S. Along with multi-function operation and the highest levels of quality and performance, both models offer yet another advantage: ultra-compact dimensions ideal for DXpeditions and mobile use.

Enjoy all the advantages of these superior features:

■ Superior receiver dynamic range of 108dB ■ Kenwood's exclusive AIP (Advanced Intercept Point) system ■ General coverage receiver ■ Automatic antenna tuner (TS-450S only) ■ Inbuilt automatic ATU option (TS-690S only) ■ Ultra-compact design ■ Excellent split frequency operation ■ CW pitch and CW reverse mode selection ■ Digital bar meter and multi-function LCD display ■ IF shift circuit ■ Dual-mode noise blanker (pulse or 'woodpecker') ■ 1Hz fine tuning ■ 100 memory channels ■ 100 watts output on all HF bands ■ 50 watts output on 50 to 54 MHz six metre band (TS-690S only)

HF TRANSCEIVER **TS-450S/TS-690S** HF TRANSCEIVER

KENWOOD ELECTRONICS AUSTRALIA PTY. LTD.
(INCORPORATED IN N.S.W.)

8 Figtree Drive, Australia Centre, Homebush, N.S.W. 2140
Phone (02) 746 1519, (02) 746 1888, Fax (02) 746 1509
Call now for further information and the name of your nearest authorised Kenwood dealer.

Kenwood Electronics Australia Pty Ltd only warrants products purchased from their authorised Australian dealers.

Please phone, mail or fax for information
Name.....
Address.....
..... Postcode.....
Publication..... Issue .....
Model.....ce

AMATEUR RADIO

THE WIA RADIO AMATEUR'S JOURNAL

Vol 60 No 1 ISSN 0002-6859 January 1992

Amateur Radio is published by the Wireless Institute of Australia, ACN 004 920 745 as its Official Journal, on the last Friday of each month.

EXECUTIVE EDITOR
Bill Rice VK3ABP

MANAGING EDITOR
Graham Thornton VK3IY

SENIOR TECHNICAL EDITOR
Peter Gibson VK3AZL

Technical Editors
David Brownsey VK4AFA
Don Graham VK6HK
Evan Jarman VK3ANI
Peter O'Connor VK4KIP
Gil Sones VK3AUI
Phil Steen VK4APA
Roy Watkins VK6XV

DRAFTING
Vicki Griffin VK3BNK

MARKETING
Bruce Kendall VK3WL
Norm Eyres VK3ZEP

ADVERTISING
Brenda Edmonds VK3KT
June Fox

BUSINESS MANAGER
Bill Roper VK3ARZ

All contributions and correspondence concerning the content of *Amateur Radio* should be forwarded to:
The Editor
Amateur Radio
PO Box 300
Caulfield South
Vic 3162

REGISTERED OFFICE
3/105 Hawthorn Road
Caulfield North Vic 3161
Telephone: (03) 528 5962
Fax: (03) 523 8191

Business hours: 9.30am to 3pm weekdays

Deadlines

	Editorial	Hamads
February	13/1/92	15/1/92
March	10/2/92	12/2/92
April	9/3/92	11/3/92

Delivery of *AR:* If this magazine is not received by the 15th of the month of issue, and you are a financial member of the WIA, please check with the Post Office before contacting the registered office of the WIA.

CONTENTS

Cover
Photo: Snapper Island VK2CC club station of the NSW chapter of the RNARS. For the full story, see Snapper Island on p24. Photo by Dave Stevens.

EDITOR'S COMMENT

BILL RICE VK3ABP EXECUTIVE EDITOR

Lies, Damned Lies and?

Yes, I am going to produce some statistics? Even so, in spite of the quotation borrowed as a title (was it Winston Churchill?) I found these figures very revealing. While I hoped they might serve to support the claim I had in mind, I was nevertheless surprised to find how strongly they did support it.

"Stop talking in riddles," I hear you say. "Come to the point, and stop beating around the bush!" Right, here goes. Every year, early in December, we start hearing from people who have just received their WIA subscription notice. And some we don't hear from at all! Most of you, solid, reliable, public-spirited people that you are, simply send in a cheque and that's that. Some enclose a note, usually to the effect that the cost of belonging to the WIA keeps on getting higher and higher, and they don't know if they can keep it up much longer. And some just quietly disappear from the list of members.

So I thought I would do a little historical research to confirm (or otherwise) whether in fact WIA subscriptions are rising faster than they should. Essentially, it has been Executive policy for many years that subs should rise no faster than the Consumer Price Index. Not having immediate access to these figures, I chose my own cheque-book records as an alternative. I found I had all my records intact, back to 1974. Until 1987, when I retired, I was a middle-level employee of the Commonwealth Public Service, at the top of the pay range for my classification, thus receiving no annual increment other than a CPI adjustment. Upon retirement, my pay dropped to about half what it had been till then, but is still adjusted annually in accordance with the declared CPI.

My cheque-book also recorded the amount of each year's WIA sub, so it was easy to work out as a yardstick figure the sub amount as a percentage of two weeks' pay. Until retirement, this percentage was never more than 6.3 (in 1976), nor less than 4.1 (in 1974). As a percentage of retirement income, it rose to 9.5 in 1988, and peaked at 10.8 in 1990, falling to 10.7 in 1991 and 10.5 this year. So, for those whose income is tied to CPI, the WIA is actually costing **less than last year,** and that was cheaper than the year before!

I know many people are not fortunate enough to receive CPI adjustments. Many people are not even fortunate enough to have a job in this current recession. The WIA does offer membership at concession rates to those in financial difficulty. But, even at full rates, the WIA is as much a bargain as always, and steadily improving. You can't afford not to belong!

ar

Help protect our frequencies – become an intruder watcher today

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

Wireless Institute of Australia

The world's first and oldest National Radio Society — Founded 1910

Representing the Australian Amateur Radio Service — Member of the International Amateur Radio Union
Registered Executive Office of the WIA: 3/105 Hawthorn Road, Caulfield North, Vic 3161
All mail to: **PO Box 300, Caulfield South, Vic 3162**. Telephone: (03) 528 5962

Fax: (03) 523 8191

Business Hours: 9.30am to 3.00pm on weekdays

General Manager and Secretary: Bill Roper VK3ARZ

EXECUTIVE

President:	Peter Gamble	VK3YRP	**VK1 Federal Councillor:**	Rob Apathy	VK1KRA
Vice Chairman:	Ron Henderson	VK1RH	**VK2 Federal Councillor:**	Terry Ryeland	VK2UX
	Roger Harrison	VK2ZTB	**VK3 Federal Councillor:**	Peter Maclellan	VK3BWD
	Kevin Olds	VK1OK	**VK4 Federal Councillor:**	Murray Kelly	VK4AOK
	Bill Rice	VK3ABP	**VK5 Federal Councillor:**	Bill Wardrop	VK5AWM
Immediate Past President:	David Wardlaw	VK3ADW	**VK6 Federal Councillor:**	Neil Penfold	VK6NE
Honorary Legal Counsel:	George Brzostowski	VK1GB	**VK7 Federal Councillor:**	Joe Gelston	VK7JG

FEDERAL CO-ORDINATORS

Amsat:	Graham Ratcliff	VK5AGR	**Int'l Travel Host Exch:**	Ash Nallawalla	VK3CIT
Awards:	John Kelleher	VK3DP	**QSL Manager (VK9, VK0)**	Neil Penfold	VK6NE
Contest Manager:	Neil Penfold	VK6NE	**FTAC:**	John Martin	VK3ZJC
Education:	Brenda Edmonds	VK3KT	**Federal Tapes:**	Ron Fisher	VK3OM
EMC:	Hans Ruckert	VK2AOU	**Standards:**	Roger Harrison	VK2ZTB
Historian:	John Edmonds	VK3AFU	**Videotape:**	John Ingham	VK5KG
Intruder Watch:	Gordon Loveday	VK4KAL	**WICEN:**	Leigh Baker	VK3TP

WIA NEWS

FROM THE WIA EXECUTIVE OFFICE

Exams Update

After just two months of operation, while still running in parallel with the old system of examinations, WIA Exam Service has registered 170 accredited examiners, with more applications being received every day, and examinations material has been supplied to examiners for a total of 326 separate exam subjects.

It has been interesting to analyse the examination results and find that the pass rates in some subjects are lower than expected. For example, only a 30.2% pass rate in AOCP theory, 50% in Regulations, 25.8% in AOCP Morse Receiving, and 33.3% in NAOCP Morse Receiving.

These results suggest that many candidates are ill-prepared for the examinations. Or it may be that they are just "having a go" for familiarisation with the system, and not expecting to pass. It is of course early days yet for any definitive analysis of examination statistics, but it is a concerning trend. Examiners intending to run examinations during the holiday season should allow plenty of time when applying to WIA Exam Service for examination materials. In the past few weeks we have found that Australia Post is often taking more than a week for delivery of interstate certified mail, and expect this to become worse as the season becomes busier. In order to minimise the delay between examiners sending off an order to WIA Exam Service for examination material and receiving the material in the post, particularly for those located in the more distant areas from Melbourne, orders for material can now be sent by fax. A faxed order must, however, include complete credit card debit details and authority.

Examination Question Banks

The October 1991 quarterly Executive meeting set up an examinations sub-committee to maintain and extend the question banks and to monitor examination material production. Under the agreement on examinations between the DoTC and the WIA all additions to the question banks must be approved by at least three educationally qualified persons.

The committee will also remove from the existing question banks some questions which have caused concern. Members' questions will be welcomed by the sub-committee, especially if they relate to the areas of need listed in the Education Notes column on page 47 of the December 1991 issue of *Amateur Radio* magazine. At present questions on basic calculations

WIA DIVISIONS

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually their residential State or Territory, and each Division looks after amateur radio affairs within their State.

Division	Address	Officers		
VK1	ACT Division GPO Box 600 Canberra ACT 2601 Phone (06) 247 7006	President Secretary Treasurer	Christopher Davis Jan Burrell Ken Ray	VK1DO VK1BR VK1KEN
VK2	NSW Division 109 Wigram St Parramatta NSW (PO B ox 1066) Parramatta 2124) Phone (02) 689 2417 Fax (02) 633 1525	President Secretary Treasurer (Office hours	Roger Henley Bob Lloyd-Jones Bob Taylor Mon-Fri 1100-1400 Wed 1900-2100)	VK2ZIG VK2YEL VK2AOE
VK3	Victorian Division 40G Victory Boulevard Ashburton Vic 3147 Phone (03) 885 9261	President Secretary Treasurer Office hours 0830-1530 Tue & Thur	Jim Linton Barry Wilton Rob Hailey	VK3PC VK3XV VK3XLZ
VK4	Queensland Division GPO Box 638 Brisbane Qld 4001 Phone (07) 284 9075	President Secretary Treasurer	John Aarsse Bob Lees Eric Fittock	VK4QA VK44ER VK4NEF
VK5	South Australian Division 34 West Thebarton Rd Thebarton SA 5031 (GPO Box 1234 Adelaide SA 5001) Phone (08) 352 3428	President Secretary Treasurer	Rowland Bruce John McKellar Bill Wardrop	VK5OU VK5BJM VK5AWM
VK6	West Australian Division PO Box 10 West Perth WA 6005 Phone (09) 388 3888	President Secretary Treasurer	Cliff Bastin John Farnan Bruce Hedland-Thomas	VK6LZ VK6AFA VK6OO
VK7	Tasmanian Division 148 Derwent Ave Lindisfarne Tas 7015	President Secretary Treasurer	Tom Allen Ted Beard Peter King	VK7AL VK7EB VK7ZPK
VK8	(Northern Territory) is part of the VK5 Division and relays broadcasts from VK5 as shown (received on 14 or 28MHz).			

Note: All times are local. All frequencies MHz.

Weekly News Broadcasts	1992 Fees	
3.570MHz	(F)	$70.00
2m ch 6950 Rebroadcast Mondays 8pm	(G) (S)	$56.00
70cm ch 8525 2000 hrs Sun	(X)	$42.00
From VK2WI at 1045 and 1915 on Sunday on the following frequencies and modes: (*1045 only): 1.845 AM; 3.595 AM morning and SSB evening; 7.146 AM*; 10.125 SSB; On relay 14.160 SSB* and 21.170 SSB; 28.320 SSB; 52.120 SSB; 52.525 FM; 144.120 SSB; 147.000 FM; 438.525 FM; On relay 584.750 ATV sound; 1281.750 FM. Plus automatic relays to 2m repeaters surrounding Sydney and manuals to several country repeaters. News headlines by phone (02) 552 5188	(F) (G) (S) (X)	$66.75 $53.40 $38.75
1.840MHz AM, 3.615 SSB, 7.085 SSB, 147.250 FM(R) Mt Macedon, 147.225 FM(R) Mt Baw Baw 146.800 FM(R) Mildura 438.075 FM(R) Mt St Leonard 1030 hrs on Sunday	(F) (G) (S) (X)	$72.00 $58.00 $44.00
1.825, 3.605, 7.118, 10.135, 14.342, 18.132, 21.175, 24.970, 28.400, MHz 52.525 regional 2m repeaters and 1296. 100 0900 hrs Sunday Repeated on 3.605 & 147.150MHz, 1930 Monday	(F) (G) (S) (X)	$70.00 $56.00 $42.00
1820kHz 3.550MHz, 7.095, 14.175, 28.470, 53.100, 145.000, 147.000 FM(R) Adelaide, 146.700 FM(R) Mid North, 146.900 FM(R) South East, ATV Ch 34 579.00 Adelaide, ATV 444.250 Mid North Barossa Valley 146.825, 438.425 (NT) 3.555M 146.500, 0900 hrs Sunday	(F) (G) (S) (X)	$70.00 $56.00 $42.00
146.700 FM(R) Perth, at 0930 hrs Sunday, relayed on 3.560, 7.075, 14.115, 14.175, 21.185, 28.345, 50.150, 438.525MHz Country relays 3582, 147.350(R) Busselton 146.900(R) Mt William (Bunbury) 147.225(R) 147.250(R) Mt Saddleback 146.725(R) Albany 146.825(R) Mt Barker Broadcast repeated on 3.560 at 1930 hrs	(F) (G) (S) (X)	$60.75 $48.60 $32.75
146.700MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 147.000 (VK7RAA), 146.750 (VK7RNW), 3.570, 7.090, 14.130, 52.100, 144.100 (Hobart) Repeated Tues 3.590 at 1930 hrs	(F) (G) (S) (X)	$67.00 $53.65 $39.00

Membership Grades
Full (F) Pension (G)
Needy (G) Student (S)
Non receipt of AR (X)

Three-year membership available to (F) (G) (X) grades at fee x 3 times

of power, Ohms law, components in series or parallel or conversion of units are not needed.

The aim of the sub-committee is to build up each question bank to a minimum of 1500 to 2000 good questions.

Packeteers - You Are What You Write

A small monthly publication from the ARRL entitled **QEX: The ARRL Experimenters' Exchange** primarily provides a venue for documenting advanced technical work in the amateur radio field. It also provides a medium for exchange of ideas between amateur experimenters. A long letter from Lee W2QNL about what is appearing on packet bulletin boards was published in the November 1991 issue of QEX and makes interesting and thought provoking reading.

The letter is too long to quote fully, but the following comments are worthy of consideration. Lee is concerned about the "everyday loading of any discussion material on PBBSs", the "lack of observance of the rules of common sense as applied to discussion or debate in general", and those amateurs who "create a piece of writing `live' at the keyboard and put it `on line' without taking the time to cool down and rethink the product of their haste and/or passion".

Further on Lee writes "The requirements for accuracy are less stringent on the phone bands than when you commit your thoughts to paper or CRT". And "People who have little experience with vocal debate will prudently hesitate to give speeches off the cuff, but, strange to say, seated at a world-embracing packet keyboard, with no one looking over their shoulder, they suddenly become expert at what to write about. It's similar to the mental change that overcomes meek people who turn into raging ogres when behind the wheel of a powerful car. Demons on the loose!"

Are Australian packet users guilty of not pausing to think about the material they are putting up on packet BBSs? What do you think?

Pervasive Technology

Talking about the ARRL publication, QEX, an editorial in the June 1991 issue by Paul Rinaldo W4RI discusses the term "pervasive technology" which means a gadget so ubiquitous that everyone not only has one, but knows how to use it and cannot remember not having one since birth. Things like the telephone, and radio broadcasting for most people.

After discussing future candidates for pervasive technology rating, such as VCRs and cellular telephones, the editorial queries what pervasive technology there could be in amateur radio (handhelds? packet?), and then develops the argument to ask some questions:

Should amateur radio equipment be designed for maximum ease of operation, with the technology hidden, thus making it possible for a greater number of people to make use of them? Or, should we recognise that amateur radio is a technical avocation and let the technology hang out there so amateurs will know what's going on inside the boxes? If it's there to see, touch and feel, isn't it more likely that amateurs would get ideas on how to improve things? Is more progress made by improving the mainstream systems or by innovative advancements in the state-of-the-art in experimental technology?

What do you think?

New Callsign Prefixes for Japan

As we all know Japanese callsigns usually begin with "J". DXers will know that as from April last year new callsign prefixes in the "7K1 to 7N1" prefix block were issued to amateurs in the Tokyo area. However, news from JARL advises that as from August this year that block was full, and now the prefix block "7K2 to 7N4" has been allocated.

Japanese Radio Stations

The October 1991 issue of The JARL News contains some interesting statistics. As at 30th June 1991 there were 6,652,060 radio stations in Japan. The largest group consists of 1,638,912 stations for personal use, followed by 1,405,377 representing stations for telecommunication business. The third largest group in classification by use is 1,124,018 amateur radio stations.

The potential for QRM in Japan must be incredible, particularly compared to Australia with 17,572 licensed radio amateurs operating in a country many times the land area of Japan.

1991 Ross Hull Contest

The 1991 - 1992 Ross Hull Memorial VHF-UHF Contest runs from 20th December 1991 until January 12th 1992, but even if you missed the start of the contest it is not too late, as the score is calculated on the entrant's best seven days, which need not be consecutive.

Also, the 1992 VHF-UHF Field Day Contest has been moved forward from the Australia Day weekend to co-incide with the last weekend of the Ross Hull Contest which is the 11th & 12th January 1992

The rules for both contests were published in the December 1991 issue of *Amateur Radio* magazine on page 42. Why not take advantage of the summer propagation conditions and the extra activity on VHF/UHF during these contests? And don't forget to submit your logs in good time.

VHF Communications Magazine

This English language version of the German publication UKW-BERICHTE covers VHF, UHF and Microwaves, and is a must for all serious users of the spectrum above 50 MHz. Current subscribers to this quarterly magazine have been reminded that their subscription renewals for 1992 are now due.

Any members wishing to subscribe to VHF Communications for the first time should contact the WIA Executive Office at PO Box 300, Caulfield South, 3162, no later than 31st January 1992 to ensure receipt of all four 1992 issues on time.

Subscription rates for 1992 are $35.00 (surface mail) or $48.00 (airmail) direct from the UK.

WARC 92 and 40 Metres

Many agenda items for WARC 92 could have an impact on amateur radio. However, to many amateurs around the world the most critical area is in relation to the 40 metre band. In view of the agenda item calling for the expansion of HF broadcasting allocations, the IARU believes that this may be the one issue where amateurs have the most to lose.

The IARU position on this issue is quite clear: **The amateur service requires a worldwide allocation of 300 kHz of bandwidth in the vicinity of 7 MHz.**

The IARU, and all amateur delegates at WARC 92, will be supporting and pushing for this proposal. However, if it is successful, it could take up to 10 years or more before the 300 kHz area was cleared for exclusive amateur use.

WIA DoTC Liaison

An important role of the Federal body of the WIA is liaison and negotiation with the central office of the Department of Transport and Communications in Canberra. Communication with DoTC Canberra has improved con-

siderably over the past 12 months, and many outstanding matters have been satisfactorily concluded.

As part of the continuing dialogue, an informal meeting was held in the Executive Office between the WIA's General Manager and David Hunt, Manager Licensing from DoTC in Canberra.

Sixteen items were on the agenda and most were satisfactorily progressed as a result of the meeting. Of particular interest is the negotiations in regard to deregulation of the amateur service in Australia, particularly in regard to repeaters and packet radio.

1991 AR Awards

Amateur Radio magazine is a magazine of the members, for the members, of the organisation which represents the Australian amateur service both nationally and internationally.

Quite a few of the interesting and original articles which appear in Amateur Radio are republished in overseas publications. But being published in Australia, and possibly overseas, is not the only accolade for which authors of articles submitted to Amateur Radio magazine become eligible.

Each year the WIA Publications Committee selects winners of the three annual magazine awards. With the wide range of quality articles which appeared in our magazine during the 12 issues published during 1991, the task of the Publications Committee was not an easy one.

However, after much deliberation, the following winners were selected.

The **Al Shawsmith Journalistic Award**, presented for the article on a radio theme considered best to display literary merit, was awarded to Marilyn Williams. The winning article *How to Occupy the XYL So You Can Enjoy Urunga* appeared in the August 1991 issue of Amateur Radio, commencing on page 27. Marilyn receives an engraved wall plaque as well as a cheque for $100.00.

The **Technical Award**, for the best technical article published during the year, was awarded to Bill Magnusson VK3JT for his 10 part series *Getting Started with Amateur Radio Satellites* which was published in the January to November issues of Amateur Radio magazine, excluding the February issue. Bill receives a cheque for $100.00.

The **Higginbotham Award**, for meritorious service to amateur radio generally, was awarded to Drew Diamond VK3XU for his *splendid and continuing efforts in encouraging "homebrew" construction*. Drew also receives a cheque for $100.00.

WIA Exam Service Accredited Examiners

(Listed in Postcode order)

Below is a list of examiners accredited by **WIA Exam Service** to conduct radio amateur examinations using **WIA Exam Service** examination materials.

The list is published in postcode order to assist candidates to determine the examiner closest to their location. This list was up-to-date as at 9th December 1991, but more applications to become an accredited examiner are being received every day.

Accredited examiners will not only provide advice and assistance about examinations, but also about "how to become a radio amateur", to all interested enquirers in their locality. The DoTC and **WIA Exams Service** direct all such enquiries to accredited examiners in the area in which the enquirer lives.

Examiner	Examination Business Name	Postal Address and Telephone Number
Jim Jones VK5JF	Darwin Amateur Radio Club Inc	GPO Box 3583, Darwin, 0801. Tel 089 46 6101 (BH)
Barrie Burns VK8DI	Darwin Amateur Radio Club Inc	1 Kerin Pl, Rapid Creek, 0810. Tel 089 85 1068 (AH)
Spud Murphy VK8ZWM	Darwin Amateur Radio Club Inc	139 Lee Pt Rd, Wagaman, 0810. Tel 089 46 5887 (BH)
Henry Newland VK8HN	Darwin Amateur Radio Club Inc	GPO Box 717, Darwin, 0810. Tel 089 81 8444 (BH)
Trevor Connell VK8CO	Darwin Amateur Radio Club Inc	PO Box 40441, Casuarina, 0811. Tel 089 27 9256 (AH)
Richard Hand VK8AZ	Gove Amateur Radio Group	PO Box 211, Nhulunbuy, 0881. Tel 089 87 3148 (AH)
Eric Van De Weyer VK2KUR	WARS Examinations	PO Box 131, Watsons Bay, 2030. Tel 02 318 6138 (BH)
George Voron VK2BGV	International ARC	2 Griffith Avenue, Roseville, 2069. Tel 02 417 1066
Sam Voron VK2BVS	International ARC	2 Griffith Avenue, Roseville, 2069. Tel 02 417 1066
Cec Purvis L20997	WIA NSW Division	PO Box 1066, Parramatta, 2124. Tel 02 649 9234
Terry Ryeland VK2UX	WIA NSW Division	PO Box 1066, Parramatta, 2124. Tel 02 689 2417 (BH)
Bob Girdo VK2RG	West Ham Examinations	13 Iris St, Sefton, 2162. Tel 02 644 9193 (AH)
Wayne Brack VK2WDL	Bankstown Amateur Radio Club	54 Hillard St, Wiley Park, 2195. Tel 02 743 8417 (BH)
Paul Phelan VK2KYO	St George ARS Inc	PO Box 530, Engadine, 2233. Tel 02 521 3053 (AH)
Paul Smith VK2ZSA	St George ARS Inc	PO Box 530, Engadine, 2233. Tel 02 520 7323 (AH)
Ean Young VK2FSO	St George ARS Inc	PO Box 530, Engadine, 2233. Tel 02 580 5329 (AH)
Fred Lawler VK2SI	Westlakes Amateur Radio Club	PO Box 77, Warners Bay, 2282. Tel 049 64 8018 (BH)
Greg Smith VK2GJS	Westlakes Amateur Radio Club	PO Box 77, Warners Bay, 2282. Tel 049 41 3468 (BH)
Frederick Eade VK2AEE	Frederick William Eade	276 Park Ave, Kotara, 2289. Tel 049 57 5131
George Hombsch VK2FCC	Tamworth Radio Club Inc	PO Box 4, Tamworth, 2340. Tel 067 65 9351 (BH)
Neville Pratt VK2FNP	Tamworth Radio Club Inc	PO Box 4, Tamworth, 2340. Tel 067 65 4099
Allan Walker VK2ZJW	Tamworth Radio Club Inc	PO Box 4, Tamworth, 2340. Tel 067 64 1878
Val Birks VK2TB	Armidale & District ARC	Lot 79 Invergowrie Rd, MSF 2002 Armidale, 2350. Tel 067 75 2224
Roger Chubb VK2FGE	Armidale & District ARC	21 Tuncredi St, Armidale, 2350. Tel 067 72 7840 (AH)
Ken Hore VK2HE	Summerland Amateur Radio Club	PO Box 524, Lismore, 2480. Tel 066 21 8242 (BH)
Leith Martin VK2EA	Summerland Amateur Radio Club	PO Box 524, Lismore, 2480. Tel 066 24 2550 (AH)
John Toland VK2XKX	Summerland Amateur Radio Club	101 College St, Lismore, 2480. Tel 066 21 2933 (AH)
James Glenn VK2AIQ		24 Tweed Broadwater Vill, Tweed Heads South, 2486. Tel 075 24 9772
Errol Chittick VK2EGC	Tweed Valley ARC	C/- 9 Grevillia Ave, Bogangar, 2488. Tel 066 72 3237 (AH)
Phil Evans VK2KEV	Tweed Valley ARC	C/- 9 Grevillia Ave, Bogangar, 2488. Tel 066 76 1671 (AH)
LLoyd Martin VK2BYU	Tweed Valley ARC	C/- 9 Grevillia Ave, Bogangar, 2488. Tel
Tony King VK2FBD	Goulburn Amateur Radio Soc	RMB 247 Mayfield Rd, Tarago, 2580. Tel 048 49 4433 (AH)
Mike Morrissey VK1RI		32 Lonsdale St, Braddon, 2601. Tel 06 248 9600 (BH)
Barry Buschl VK2GDV	Twin Cities R & E Club Inc	355 Wilson St, Albury, 2640. Tel
Terry Clark VK2ALG	Twin Cities R & E Club Inc	PO Box 396, Albury, 2640. Tel 060 25 3292
Vic Hearne VK3CQP	Twin Cities R & E Club Inc	PO Box 396, Albury, 2640. Tel
Alan James VK2FIZ	Twin Cities R & E Club Inc	PO Box 396, Albury, 2640. Tel 060 25 1117 (AH)
Greg Sargeant VK2EXA	Twin Cities R & E Club Inc	PO Box 396, Albury, 2640. Tel 060 21 5438 (AH)
Graeme Scott VK2KE	Twin Cities R & E Club Inc	PO Box 396, Albury, 2640. Tel 060 21 3655 (BH)
Rex Black VK2YA	Education Service Wagga Wagga	562 Kooringal Rd, Wagga Wagga, 2659. Tel 069 22 4691

Pixie Chapple VK2KPC	St John Ambulance ARC	231 Shepherd St, St Marys, 2760. Tel 02 623 5663 (AH)
Leon McHugh VK2FLI	Chifley Amateur Radio Club	PO Box 280, Mt Druitt, 2770. Tel 02 625 9646
Dave Pola VK2BDP	Chifley Amateur Radio Club	PO Box 280, Mt Druitt, 2770. Tel 02 628 9247 (AH)
Ralph Simmons VK2GRS	Chifley Amateur Radio Club	PO Box 280, Mt Druitt, 2770. Tel 02 671 4756
Alan Whitmore VK2YYJ		32 Greens Pde, Valley Heights, 2777. Tel 02 625 1388 (BH)
Adrian Clout VK2BFN	St Johns Ambulance Radio Club	137 Lower Valley Rd, Hazelbrook, 2779. Tel 047 58 6797
Peter Van Gemert VK2ALL	Bathurst Amateur Radio Club	291 Durham St, Bathurst, 2795. Tel 063 31 2464
Neville Wilde VK2DR	Bathurst Amateur Radio Club	22 White St, Bathurst, 2795. Tel 063 31 5809 (AH)
Vicki Marsden VK2EVM		Unit 11 "Woodlands", Hale St Orange, 2800. Tel 063 62 0087 (AH)
Brian Cooper VK2DHO	Parkes & District ARC Inc	C/- 4 William St, Parkes, 2870. Tel 068 62 2828
Tom Darcy VK2DDD	Parkes & District ARC Inc	4 William St, Parkes, 2870. Tel 068 62 1663 (AH)
Walter Field VK2NNF	Parkes & District ARC Inc	C/- 4 William St, Parkes, 2870. Tel 068 62 1776
Dave Kent VK2BJI	Parkes & District ARC Inc	PO Box 564, Parkes, 2870. Tel 068 62 2154
Jan Burrell VK1BR	WIA ACT Division	20 Currey St, Gowrie, 2904. Tel
Chris Edmondson VK3YID	ARA Exam Service	GPO Box 628E, Melbourne, 3001. Tel 03 6014203 (BH)
Peter Ormerod VK3CPO	RAAF Williams ARC	MCS No 1 Aircraft Depot, RAAF Williams Laverton, 3027. Tel 03 368 2266 (BH)
Bruce Kendall VK3WL	RAAF Williams ARC	8 Walwa Place, Werribee, 3030. Tel 03 741 7654 (AH)
Dixie Lee VK7HP	RAAF Williams ARC	5/24 Salisbury St, Werribee, 3030. Tel 03 742 3786
Brian Purcell VK3BQP		27 Kathleen St, Pascoe Vale South, 3044. Tel 03 386 7750
Howard Rider VK3ZJY		232 Cumberland Road, Pascoe Vale, 3044. Tel 03 306 8484
Des Bird VK3EDB	Electrotechnology RMIT	8 Queen St, Surrey Hills, 3127. Tel 03 836 1837 (AH)
Geoff Atkinson VK3YFA	EMDRC	PO Box 87, Mitcham, 3132. Tel 03 876 4850 (AH)
Jack Bramham VK3WWW	EMDRC	PO Box 87, Mitcham, 3132. Tel 03 873 2459 (AH)
Joe Magee VK3BKI	EMDRC	PO Box 87, Mitcham, 3132. Tel 03 729 8579 (AH)
Dave Neville VK3UC	EMDRC	PO Box 87, Mitcham, 3132. Tel 03 802 7492 (AH)
David Nisbet VK3XDA	EMDRC	PO Box 87, Mitcham, 3132. Tel 03 420 2035 (BH)
Len Vermeulen VK3COD	EMDRC	PO Box 87, Mitcham, 3132. Tel 03 808 5350 (AH)
Neale McLennan VK3BOS	Healesville ARG Inc	42 Panfield Ave, Ringwood, 3134. Tel 03 870 4491 (BH)
Craig McMillan VK3CRA	VK3CRA Amateur Exams	5 Sunview Crt, Dingley, 3172. Tel 03 551 5635
Mark Diggins VK3JMD		1 Pembroke Cres, Cheltenham, 3192. Tel 03 583 7692 (AH)
Brett Leslie VK3JHP		35 Evesham Rd, Cheltenham, 3192. Tel 03 584 4230 (AH)
Gordon Buchanan VK3BGB	FAMPARC	PO Box 38, Frankston, 3199. Tel 03 789 7710
Audrey Gibson VK3FI		94 Kars St, Frankston, 3199. Tel 03 783 8714
Len Gibson VK3SI		94 Kars St, Frankston, 3199. Tel 03 783 8714
Graham Wallington VK3BGL	FAMPARC	13 Milford Cres, Frankston, 3199. Tel 03 789 2972 (AH)
Ian Stowe VK3GA	FAMPARC	20 Norfolk Cres, Frankston North, 3200. Tel 03 785 2976 (AH)
Chas Gnaccarini VK3BRZ	Geelong Amateur Radio Club	66 Smeaton Close, Lara, 3212. Tel 052 82 3167 (AH)
Lee de Vries VK3PK	Geelong Amateur Radio Club	215 Swan Bay Rd, Wallington, 3221. Tel 052 50 1105 (AH)
Reg Carter VK3CAZ	BARG	PO Box 216E, Ballarat East, 3350. Tel 053 41 7585 (AH)
Gordon Cornell VK3FGC	BARG	PO Box 216E, Ballarat East, 3350. Tel 053 39 2427 (AH)
Tom George VK3DMK	BARG	PO Box 216E, Ballarat East, 3350. Tel 053 32 7234 (BH)
Ian McDonald VK3AXH	BARG	PO Box 216E, Ballarat East, 3350. Tel 053 31 1317 (BH)
Charlie Stewart VK3DCS	BARG	PO Box 216E, Ballarat East, 3350. Tel 053 31 7425
Andy Squires VK3DTO	Horsham Amateur Radio Club	PO Box 720, Horsham, 3401. Tel 053 82 1439 (BH)
David Timms VK3YLV	Horsham Amateur Radio Club	PO Box 720, Horsham, 3401. Tel 053 82 5399 (BH)
Mark Weaver VK3KZZ	Horsham Amateur Radio Club	PO Box 720, Horsham, 3401. Tel 053 81 1711 (BH)
Derek Thurgood VK3DD	Healesville ARG Inc	PO Box 234, Yarra Glenn, 3775. Tel 03 730 1557 (AH)
Graeme Tremellen VK3GPT	Healesville ARG Inc	PO Box 285, Healesville, 3777. Tel 059 62 4111
John Hill VK3WZ		6 Cumberland Way, Endeavour Hills, 3802. Tel 03 700 5428
Peter Freeman VK3KAI	VK3 Eastern Zone Education	PO Box 273, Churchill, 3842. Tel 051 22 2550 (AH)
Henk Pillekers VK3CAQ	VK3 Eastern Zone Education	PO Box 65, Churchill, 3842. Tel 051 22 1885 (AH)
George Hoddinott VK3AYI	WIA East Gippsland Zone	Lot 23 Acacia Rd, Raymond Island, 3880. Tel
Kevin McGrath VK3EQM	WIA East Gippsland Zone	12 Government Rd, Paynesville, 3880. Tel 051 56 6938
Bob Neal VK3ZAN	WIA East Gippsland Zone	76 Langford Pde, Paynesville, 3880. Tel 051 56 7654
John Piovesan VK3GU	WIA East Gippsland Zone	15 Gilsenan St, Paynesville, 3880. Tel 051 56 6110
Frank Feldman VK3BC	Southern Peninsula Radio Club	11 Flamingo Rd, Rosebud West, 3940. Tel 059 86 2031
Vic Vickery VK3DEA	Southern Peninsula Radio Club	11 Flamingo Rd, Rosebud West, 3940. Tel 059 86 1327
Ted Raven VK4KRR	Brisbane North Radio Club	22 David St, Toombul, 4012. Tel 07 266 6197
Bob Neville VK4ACL	Brisbane North Radio Club	124 Roscommon Rd, Boondall, 4034. Tel 07 265 3104
Roy Mahoney VK4BAY	Bayside District ARS Inc	PO Box 411, Capalaba, 4157. Tel 07 396 1655
Nic Chantler VK4DIT	Gold Coast ARS Inc	PO Box 6620, Gold Coast Mail Centre, 4217. Tel 075 39 6609 (AH)
Robert White VK4TRW	Gold Coast ARS Inc	5 McCubbin Crt, Burleigh Heads, 4220. Tel 075 35 2222 (AH)
Mal Beck	Concordia College Toowoomba	154 Stephen St, Toowoomba, 4350. Tel 076 36 1700 (BH)
Graham Weier VK4AGN		C/- 58 Water St, Toowoomba, 4350. Tel 076 39 2219 (BH)
Bob Harper VK4KNH	Cunningham Radio Club	158 Wood St, Warwick, 4370. Tel 076 61 1273 (AH)
Graham Rayner VK4GDR	Cunningham Radio Club	PO Box 93, Glen Aplin, 4381. Tel 076 83 4336 (AH)
Ken Hanby VK4IS	Suncoast Amateur Radio Exams	17 Kig Hts 14 Queen St, Caloundra, 4551. Tel 074 91 5532
Bruce Bussenschutt VK4OR	Suncoast Amateur Radio Exams	2 Dewrang Pl, Wurtulla Sunshine Coast, 4575. Tel 074 93 1380
Gerry Fulton VK4GJ	Hervey Bay Amateur Radio Club	PO Box 829, Hervey Bay, 4655. Tel 071 28 3232
Gray Taylor VK4OH	Hervey Bay Amateur Radio Club	PO Box 526, Hervey Bay, 4655. Tel 071 25 7167
Ted Watson VK4EAW	Hervey Bay Amateur Radio Club	PO Box 829, Hervey Bay, 4655. Tel 071 28 3489
Reg Wheller VK4ARW	Hervey Bay Amateur Radio Club	PO Box 829, Hervey Bay, 4655. Tel 071 28 1383
Ken Blatchford VK4BKB	BARC Inc Exam Service	9 Que Hee St, Bundaberg, 4670. Tel 071 51 3195
Gerard Feerick VK4YK	BARC Inc Exam Service	M/S 108 Hoffmans Rd, Burnett Heads, 4670. Tel
Colin Hayes VK4FUV	BARC Inc Exam Service	3 Bush Rd M-S 264, Bundaberg, 4670. Tel 071 55 1616
Bob Millgate VK4ADZ	BARC Inc Exam Service	9 Chapman St, Booloolah Bundaberg, 4670. Tel 071 52 7482
Clem Steggink VK4FD	BARC Inc Exam Service	38 Moncrieff St, Bundaberg, 4670. Tel 071 52 1876
Merv Deakin VK4DV		PO Box 380, Rockhampton, 4700. Tel 079 34 0193
Lyle Dobbs VK4ALD	WIAQ CQ Branch Rockhampton	265 Carpenter St, Rockhampton, 4701. Tel 079 31 2775 (BH)
Nick Quigley VK4CNQ	WIAQ CQ Branch Rockhampton	265 Carpenter St, Rockhampton, 4701. Tel 079 31 2388 (BH)
Clive Sait VK4ACC	WIAQ CQ Branch Rockhampton	265 Carpenter St, Rockhampton, 4701. Tel 079 28 1173 (AH)
David Wilson VK4UN	Central Highlands ARC	6 Gum St, Tieri, 4709. Tel 079 84 8442
John Petersen VK4AXA		48 Littlefield St, Blackwater, 4717. Tel 079 82 5126
Lloyd West VK4QE		41 Blain St, Blackwater, 4717. Tel 079 82 6756 (AH)

Geoff Bonney VK4GI	TAFE College Emerald	Capricorn Hwy, Emerald, 4720. Tel 079 82 3699 (BH)
Bob Lee VK4CWL	Central Highlands ARC	PO Box 617, Emerald, 4720. Tel 079 82 1096 (BH)
Ron Graham VK4BRG	YUMI Exam Service	Box 323, Sarina, 4737. Tel 079 56 1155
Wal Douglas VK4AIV	Mackay Amateur Radio Assoc	PO Box 1065, Mackay, 4740. Tel 079 42 1615 (AH)
John Gillespie VK4MTF	Mackay Amateur Radio Assoc	PO Box 1065, Mackay, 4740. Tel 079 55 2006 (AH)
George Glendinning VK4AJL	Mackay Amateur Radio Assoc	PO Box 1065, Mackay, 4740. Tel 079 59 2436 (AH)
Charles Ivin VK4DK	Pelican Examinations	36 Tulloch Street, Mackay, 4740. Tel 079 52 1675 (AH)
John James VK4CMA	Mackay Amateur Radio Assoc	PO Box 1065, Mackay, 4740. Tel 079 55 2333 (AH)
Keith Carter VK4CKC	Bowen & Collinsville ARC	22 Soldiers Rd, Bowen, 4805. Tel 077 86 2497
Brian Winterburn VK4BOW		7 Hay St, Bowen, 4805. Tel 077 86 2367
Ted Golledge VK4AVG	Tropical Coast ARC	PO Box 1019, Innisfail, 4860. Tel 070 61 4517 (AH)
John Mahoney VK4JON	Cairns Amateur Radio Club Inc	PO Box 194, Innisfail, 4860. Tel 070 61 3857
Les Meier VK4EMI	Tropical Coast ARC	48 Laurie St, Innisfail, 4860. Tel 070 61 2932 (AH)
Graham Bennett VK4FGB	Cairns Amateur Radio Club Inc	PO Box 1914, Cairns, 4870. Tel 070 54 1448
Pat Laurenzi VK4MP	Cairns Amateur Radio Club Inc	PO Box 1426, Cairns, 4870. Tel 070 54 4157 (AH)
Chris Parr VK4ANI	Cairns Amateur Radio Club Inc	PO Box 1215, Cairns, 4870. Tel 070 51 0452 (AH)
Wilf Booth VK4ZNZ	Tableland Radio Electronics	MS 1318 McLean Rd, Yungaburra, 4872. Tel 070 95 3888
Aubrey McKibben VK4AFO	Tableland Radio Electronics	PO Box 102, Malanda, 4885. Tel 070 96 5962 (AH)
Graeme Bottger VK5AHQ	Port Adelaide Radio Club	68 Alma Terrace, Woodville West, 5011. Tel 08 45 7465 (AH)
Harry Hillard VK5AHH	Port Adelaide Radio Club	PO Box 265, Port Adelaide, 5015. Tel 08 49 7664
John McKellar VK5BJM	Port Adelaide Radio Club	5 Diosma Cres, Lockleys, 5032. Tel 08 43 8386 (AH)
Christine Taylor VK5CTY	Taylor Radio Group	16 Fairmont Avenue, Black Forest, 5035. Tel 08 293 5615
Geoff Taylor VK5TY	Taylor Radio Group	16 Fairmont Avenue, Black Forest, 5035. Tel 08 293 5615
Rob Gurr VK5RG		PO Box 35, Daw Park, 5041. Tel 08 276 4547
Donald McDonald VK5ADD	WIA (SA Div) INC	6 Whittier Ave, Marion, 5043. Tel 08 276 1251
Phil Day VK5QT	Adelaide Hills ARS Inc	15 Main Rd, Belair, 5052. Tel 08 366 2214 (BH)
Hans Smit VK5YX	Adelaide Hills ARS Inc	6 Jeffrey St, Hawthorn, 5062. Tel 08 271 5350 (AH)
Rowland Bruce VK5OU	WIA (SA Div) INC	42 Gleneagles Rd, Mt Osmond, 5064. Tel 08 379 4584
George Lindop VK5BGL	Port Adelaide Radio Club	28 Dyott Ave, Hampstead Gardens, 5086. Tel 08 261 5910
Bill Wardrop VK5AWM	WIA (SA Div) INC	PO Box 303, St Agnes, 5097. Tel 08 251 2154 (AH)
Rob Gunnourie VK5FI	WIA (SA Div) INC	99 Maxwell Rd, Ingle Farm, 5098. Tel 08 264 6581
Clive Harman VK5ACH	Riverland Amateur Radio Club	PO Box 628, Renmark, 5341. Tel 085 86 4204
Mike Mackintosh VK5CK	Riverland Amateur Radio Club	PO Box 646, Renmark, 5341. Tel 085 84 7101 (BH)
John Ruston VK5ARK	Riverland Amateur Radio Club	PO Box 646, Renmark, 5341. Tel 085 86 6127
Hugh Lloyd VK5BC	Riverland Amateur Radio Club	PO Box 743, Berri, 5343. Tel 085 82 2690
David Bice VK5QU	Moonta Scout Group ARC	PO Box 133, Moonta, 5558. Tel 088 25 2263
John Vayne VK5BL	Moonta Scout Group ARC	PO Box 133, Moonta, 5558. Tel 088 25 2798
Jack Kleinrahm VK5AJK	Lower Eyre Peninsula ARC Inc	11 Luke St, Port Lincoln, 5606. Tel 086 82 1466 (BH)
Jack Martin VK5EJ	Lower Eyre Peninsula ARC Inc	PO Box 937, Port Lincoln, 5606. Tel 086 82 3131 (AH)
John Plevin VK5AEP	Lower Eyre Peninsula ARC Inc	18 Wandana Ave, Port Lincoln, 5606. Tel 086 82 3161
Alan Gilchrist VK5BWG	Port Augusta ARC	6 Kinnear Street, Port Augusta, 5700. Tel 086 43 6455 (AH)
Peter Horgan VK5BWH	Port Augusta ARC	6 Kinnear Street, Port Augusta, 5700. Tel 086 42 2363 (AH)
Bill Offler VK5BWO	Port Augusta ARC	6 Kinnear St, Port Augusta, 5700. Tel 086 42 2855 (AH)
Dianne Cousins VK6BC		2 Nottingham St, East Victoria Park, 6101. Tel 09 361 3985
Glenn Cousins VK6AUZ		2 Nottingham St, East Victoria Park, 6101. Tel 09 361 3985
Rev Suter VK6SA	The Amateur Radio Exam Centre	PO Box 261, Mandurah, 6210. Tel
Con Murphy VK6PM		PO Box 88, Yarloop, 6218. Tel 097 33 1978
Allen Byrne VK6OT	Bunbury Radio Club Inc	2 Skewes St, Bunbury, 6230. Tel 097 91 1301 (AH)
Bill Harrison VK6WJH	Bunbury Radio Club Inc	PO Box 31, Bunbury, 6230. Tel 097 34 4374 (AH)
Barry Mitchell VK6HX	Bunbury Radio Club Inc	9 Henley Dve, Bunbury, 6230. Tel 097 91 1599 (AH)
John Thornborough VK6AJJ	Bunbury Radio Club Inc	PO Box 31, Bunbury, 6230. Tel 097 97 1126
Tom Reed VK6TR	Southern Electronics Group	Lot 25 Shellbay Rd, Lower King, 6330. Tel 098 4473953

ar

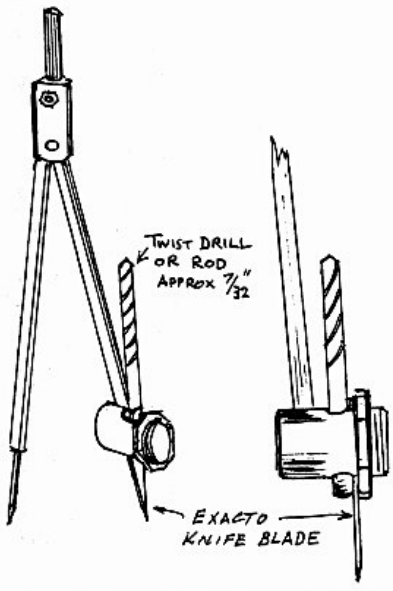
TRY THIS

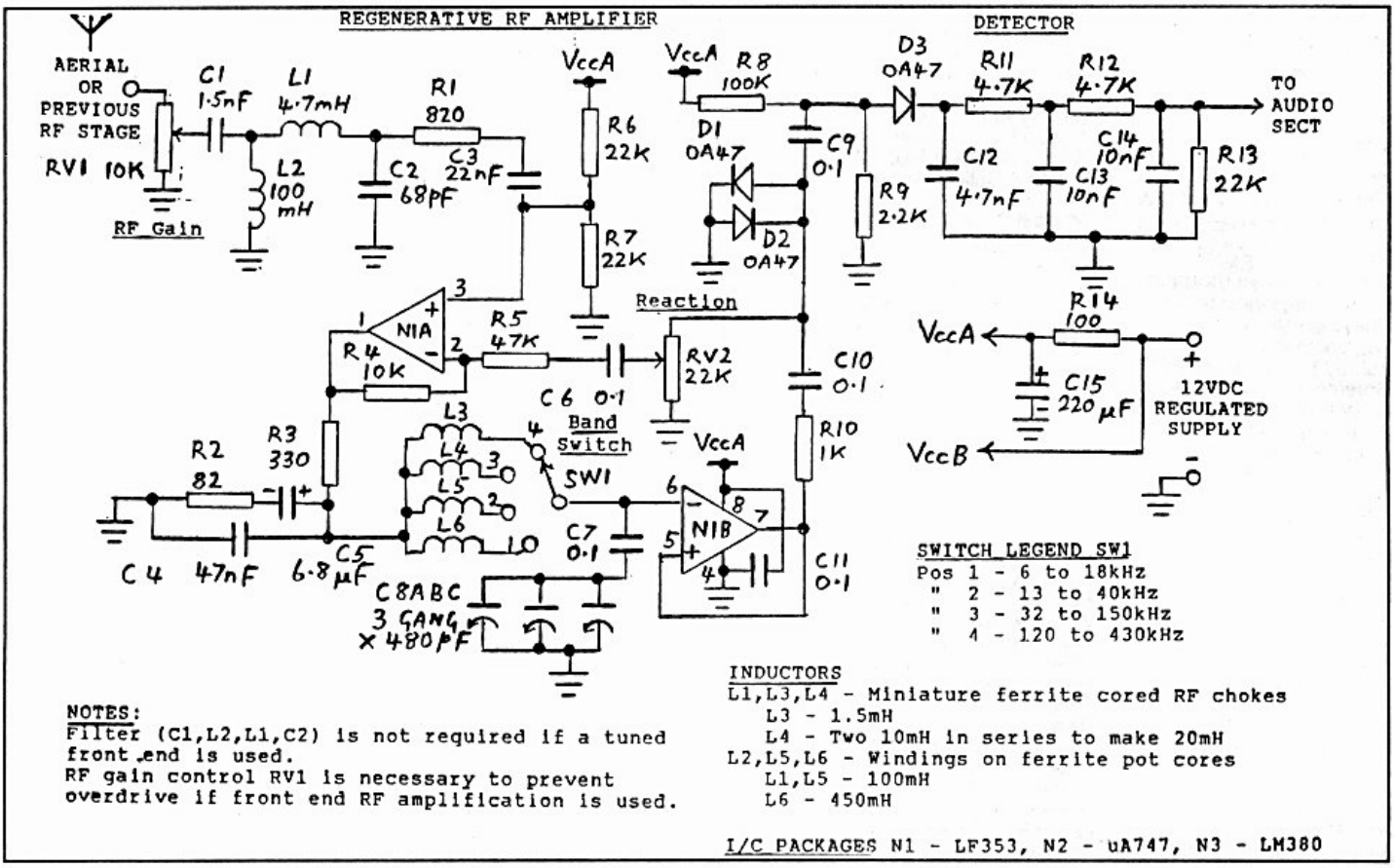
PETER SPENCER VK5KBK

Disk Cutter

I thought of this idea on a recent occasion when I wished to make a paper disc for use on an instrument dial which required hand calibration. I hit upon the idea of using an ordinary school compass and fitting an Exacto knife blade to it so I could use the device for cutting out a clean, perfectly round dial. The twist drill worked perfectly as a "packer". The flat nut on the compass presses flush on the knife blade and holds it securely. The idea works well and I have used it several times since with goods results. Using a sharp blade, it is possible to cut a circle out of fairly heavy material.

ar





VLF-LF Receiver _ Regenerative RF Section

A Simple Regenerative VLF-LF Receiver

LLOYD BUTLER VK5BR
18 OTTAWA AVENUE
PANORAMA 5041

Introduction

IN AN EARLIER ISSUE OF *Amateur Radio*, I described a superheterodyne receiver for the VLF-LF bands. This was followed by a series of articles on front end tuning and loop aerials for these bands. Now I will describe a more basic form of VLF-LF receiver.

In earlier days of radio, quite successful reception of low frequency radio waves was achieved with a single valve stage as a regenerative amplifier-detector and a valve audio amplifier. At low frequencies, a modest value of Q factor in a single tuned circuit achieved workable station selectivity which was further improved by regeneration to increase the effective Q and further reduce the circuit bandwidth. Furthermore, by increasing the regeneration to the point of oscillation, a beat frequency was produced to enable reception of CW signals (or radio teletype if used today). As the voltage magnification of a tuned circuit is equal to Q, the regeneration also improved the sensitivity of the receiver well beyond that achievable with its single RF stage as a straight amplifier.

The receiver I will describe is based on the above principles but is designed around more modern solid state amplifier packages. It tunes between 10kHz and 430kHz with quite reasonable selectivity. A selectable audio bandpass filter is included to improve the reception of narrow band signal modes in the VLF region.

Circuit Description

The regenerative RF section of the receiver is shown in figure 1A. The single tuned circuit is made up of the paralleled sections of 3 gang tuning capacitor C8 and one of the switched inductors L3, L4, L5, or L6. The tuned circuit is connected within the closed loop containing the two amplifiers of an LF353 integrated circuit package. These are JFET amplifiers

with a gain-bandwidth product of 4 MHz. Amplifier N1B is connected as a voltage follower which, with its high input resistance, prevents loading of the tuned circuit thus allowing its high Q factor to be realised. Positive feedback, or regeneration, is fed via the inverting input of N1A. The level of feedback is controlled by the setting of the reaction control RV2. The input signal is fed to the non-inverting input of N1A and combined with the regenerated signal within the amplifier. The combined signal is injected into the tuned circuit across C4. The capacitance value of C4 is large by comparison with that of the tuning capacitance and hence the injected signal source resistance has little effect on the circuit Q. The injected signal can be considered to be applied in series with the tuned circuit and whilst its developed voltage across C4 is small, it is multiplied by the circuit Q at the input of N1B.

Additional loop gain is provided by N1A and with phase reversals at N1A and at the point of injection, the circuit can be made to oscillate when the reaction control RV1 is advanced to the critical point. The circuit is different from the accepted method of applying regeneration via the RF transformer in which one winding is used for the tuned circuit, a second winding for the feedback signal and a third for the input signal. One reason for avoiding this method was to make use of single winding inductors which were on hand. The additional

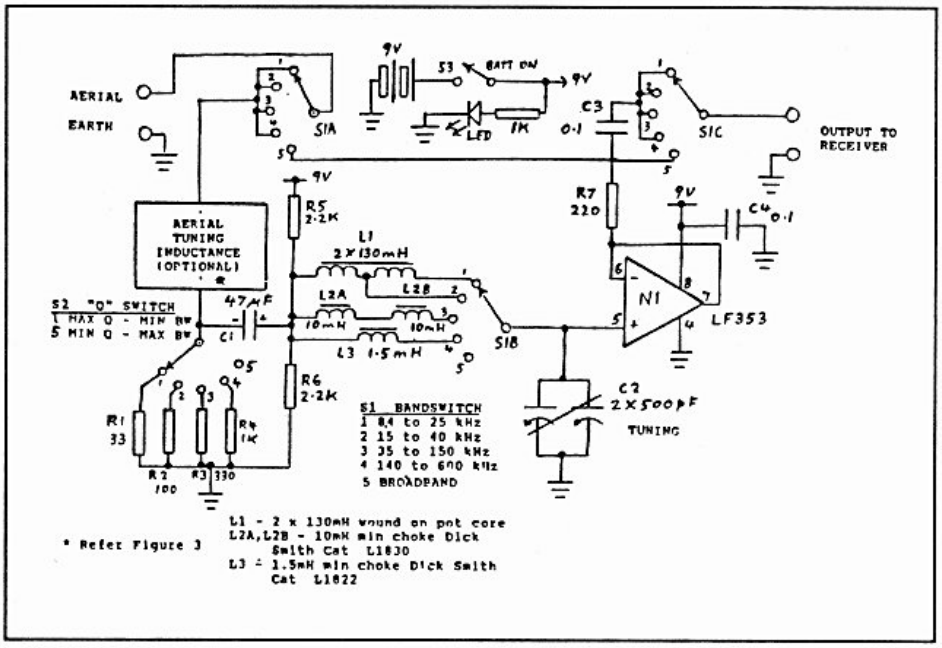


Figure 2: VLF-LF Front end tuner (AR July 1990)

windings would have meant making special transformers for the job. There are also some operational advantages in using the circuit of figure 1A. One problem in coupling an aerial directly into the tuned circuit is that when regeneration is set for oscillation, the whole thing works as a small transmitter, radiating a signal via the aerial and causing interference to others. Another problem is the changed loading on the tuned circuit for different lengths of aerial and the interaction it causes with the setting of the reaction control. By injecting the input signal and the feedback signal via different inputs of N1A, both these effects are avoided.

Some specific components in the circuit require explanation. Diodes D1 and D2 limit the amplitude of oscillation when the circuit is set in the oscillating or beat frequency mode. The curved characteris-

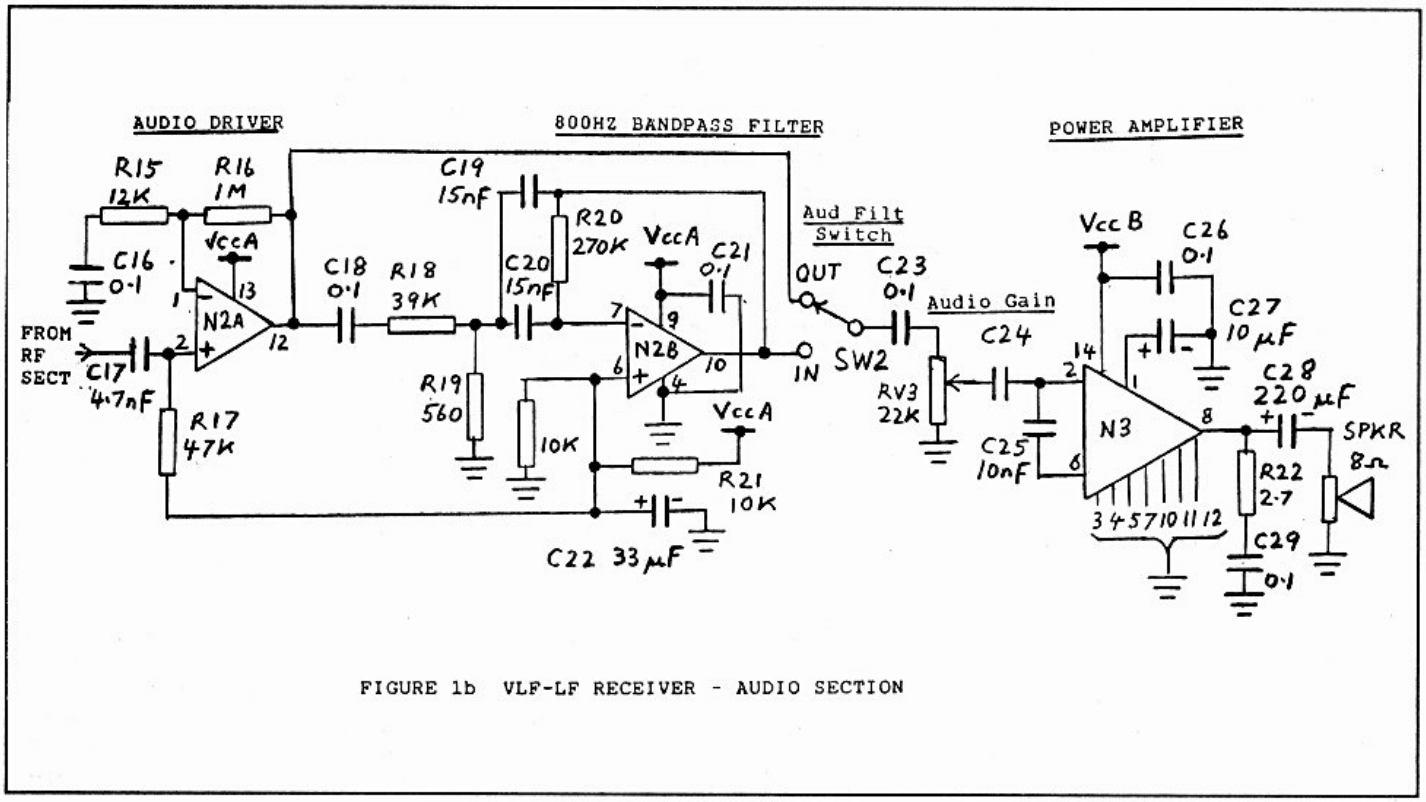


FIGURE 1b VLF-LF RECEIVER - AUDIO SECTION

tic of the diodes also give a more gentle slide into oscillation when RV2 is advanced.

Initially, when using the input directly connected to a long aerial, I had some problems with local broadcast station pick-up and low frequency power mains generated noise. Components L1 and C2 make up a low pass filter which attenuates signals above 400 kHz and eliminates the broadcast station interference. The mains generated noise was considerably reduced by the addition of R2 across capacitor C4 to limit the impedance of the tuned circuit injection point. Without this addition, the reactance of C4 at very low frequencies became very high, allowing a high level of noise at these frequencies to be injected. High pass filter C1,L2 further attenuates low frequencies below 10kHz. If the regenerative circuit is preceded by a tuned stage, rather than directly connected to an aerial, filter components C1, L2,L1, C2 can be omitted.

RF gain control RV1 is included to reduce the input level on strong signals when the input is driven from a previous RF stage. If the circuit is connected directly to an aerial, the level is lower and RV1 is not necessary.

Diode D3 and low pass filter C12,R11,C3,R12,C14 form the detector circuit. At very low frequencies (near 10kHz) the RF signal frequency approaches the frequency spectrum of the audio amplifier with a consequent tendency for the whole RF-audio link to become unstable. The second section of filtering, R12,C4, was found necessary to control this problem. There is a small positive bias applied to the detector diode via resistor R8. This shifts the diode operating point further up its characteristic curve to improve the receiver sensitivity on weak signals.

The Audio Section

The detected output is fed to the input of the audio section of the receiver (figure 1B). Device N2 is a µA747 dual operational amplifier package. N2A is used as an audio driver which feeds the power aplifier N3. Operation of the audio filter switch SW2 connects in a 800Hz bandpass filter formed by N2B and its associated circuit components. This type of filter, which requires only one amplifier unit, was described by Gilbert Griffith VK3CQ in Pounding Brass, *Amateur Radio*, February 1989 and credited to Gary Bold ZL1AN in *Break In*. Using the component values shown in figure 1B, the filter centre frequency is 800Hz with a bandwith of 84Hz (as measured). The centre frequency and bandwidth can be altered, if required, by altering the values of R19,R20,C19 & C20. The design formulae for these are included in Gilbert's article.

With the high noise level at VLF, the audio filter is a desirable addition to restrict the detected noise when receiving morse or radio teletype signals in the VLF band. To use the filter, the beat

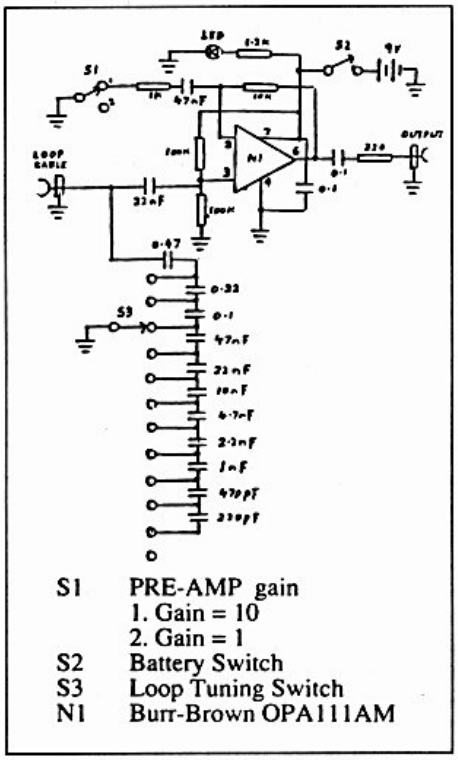


Figure 3: Loop aerial tuning & pre-amp circuit (AR Aug 1990)

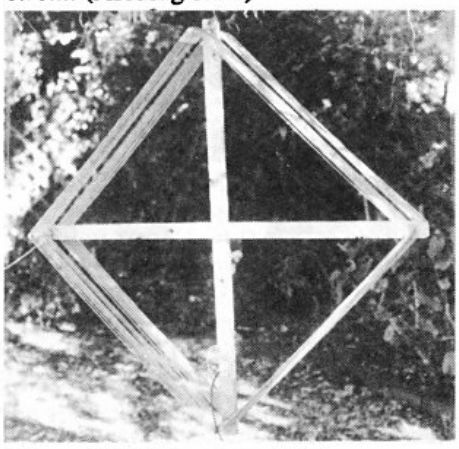


Figure 4: 20 Turn Loop Arial

frequency is set to 800Hz. With the regenerative RF circuit, this is achieved by offsetting the tuning 800Hz from the received signal frequency. In actual fact, there are two tuning positions, one below the signal frequency and one above the signal frequency. You pick the one which gives the least interference from adjacent signals or noise. This characteristic of the regenerative circuit which gives two tuning positions is very noticeable at VLF. For a 800Hz beat note, the two tuning positions are 1600Hz apart. At a typical frequency of 16kHz, this represents a tuning shift of 10% of the operating frequency.

The speaker is driven by power amplifier type LM380 (N3). This IC is available in either a 14 pin version or the smaller 8 pin version. I used the 14 pin version because I happened to have one already wired up with associated components on a board. (In my superhet receiver, *AR* Dec 1989, I did in fact use the 8 pin version).

The DC load current for the LM380 swings between 10mA and 150mA, depending on the audio power level. Hence the DC power supply to the receiver must be well regulated. The remainder of the receiver load is only 5mA and this is decoupled from the supply by R14 and C15. Even with this decoupling, instability can occur between the audio and RF sections if the supply regulation is inadequate. The nominal supply voltage is 12 but any voltage between 10 and 15 can be used.

Performance

Sensitivity of the receiver referrred to its input was measured in terms of minimum discernible signal level using a calibrated signal generator as the source. Below the point of oscillation in the regenerative circuit, the measurements were carried out with the signal generator carrier modulated with tone at 30%. At the point where oscillation just commenced (the most sensitive state), unmodulated carrier was used to beat with the internal oscillation.

With no regeneration, ie the reaction control set to zero, the minimum discernible signal level was found to be around 500 microvolts. With the reaction control set just below the point of oscillation, the figure improved to around 50 microvolts. At the point of oscillation, carrier could be detected at 3 microvolts. Sensitivity is much the same over the tuning range except that it drops above 300 kHz due to the effect of filter C1-L2. In practical terms, the receiver detects quite weak signals in the beat frequency mode. For AM signals, the receiver is less sensitive. It can receive more localised Non-Directional Beacons quite well but requires some RF pre-amplification for weaker stations.

The 3dB bandwidth was measured at input frequencies of 20kHz, 100kHz and 350kHz. The bandwidth with no regeneration measured 270Hz at 20kHz, 2.6kHz at 100kHz and 4.9kHz at 350kHz. This implies a circuit Q factor of 70 at 20kHz, 38 at 100kHz and 70 at 350kHz.

Increasing the regeneration to just below the point of oscillation, the bandwidth improved to 12Hz at a centre frequency of 20kHz, 100Hz at 100kHz and 157Hz at 350kHz. The regeneration thus increased the effective Q to 1700 at 20kHz, 1000 at 100kHz and 2200 at 350kHz.

Bandwidth measurement at the point of oscillation was not attempted as this appeared to be rather difficult to resolve. In any case, I have already pointed out that, in the beat frequency mode, the tuned circuit is offset from the incoming frequency.

In the beat frequency mode, the receiver strongly receives VLF-LF stations such as Omega around 11 to 13kHz, the North West Cape on 23.3kHz and Belconnen Navy Station on 44kHz. However, there is some limitation on adjacent channel rejection. Firstly there are two signal frequencies which can beat with the internal oscillation, one above and one below the oscillation frequency. If one of these is the desired signal frequency, the other could correspond to an adjacent operational signal frequency. Secondly, although, the tuned circuit has high effective Q and narrow 3dB bandwidth, being a single circuit the slope of the sides of its resonance curve is not as steep as that of a ceramic filter in an IF channel or even a number of cascaded tuned circuits.

Components

Apart from some of the inductors, commonly available components are used in the receiver. For the lower values of inductor, miniature ferrite RF chokes up to 10mH are obtained from Dick Smith Electronics stores. The larger inductors can be wound on almost any form of ferrite pot core but one can often find ready wound units which have been discarded from other electronic equipment. There is no need to be too fussy about the precise value of inductance. The frequency band coverage for each band switch position can always be juggled around the inductors and tuning capacitor which are on hand. Old broadcast receiver tuning gangs with sections paralleled are ideal for VLF-LF tuning and these often change hands at amateur radio buy and sell marts. I must say that a lot of my odd components come from just that source.

Pre-amplification & Tuning

The performance of the regenerative receiver, both in sensitivity and adjacent channel rejection, can be improved by the addition of a sharply tuned RF amplifier, in front of the receiver. I described such a tuner (figure 2) in *Amateur Radio* , July 1990 and this unit has been used in conjunction with the regenerative receiver to make it, in terminology, a TRF receiver. The front end is tuned to the incoming signal frequency and this provides rejection of an adjacent channel, mentioned as being a possible nuisance when operating in the beat frequency mode. Furthermore, the additional gain in the front end improves the sensitivity and hence the reception of weak signals. With the increased signal level, RF gain control RV1 is necessary to reduce the level of strong signals and prevent overload.

With the RF front end in circuit, minimum discernible signal level is around 3 to 5 microvolts for the regeneration set just below the point of oscillation. At the point of oscillation, the figure is less than 1 microvolt.

One difficulty with the separate front end tuner is manually tracking the two tuned circuits when scanning the band. By using identical tuning inductors and variable capacitors in the two tuned circuits, one could mechanically gang the two tuning capacitors (each of which is already several ganged sections paralleled). Of course in the beat frequency mode, the regenerative tuned circuit must be offset in frequency from that of the front end. To adjust for this, a small manually controlled variable capacitor across one of the two tuned circuits might be needed. It would also allow manual correction of any small tracking error.

Loop Aerial

The receiver works very well connected to a tuned loop aerial via the loop preamplifier (figure 3) which I described in *Amateur Radio* , August 1990. I recommend a loop aerial of 20 turns of at least 1mm diameter wire spaced 1cm apart on a 0.8metre square frame (refer figure 4). Used with circuit of figure 3, the loop can be brought to near resonance over the full tuning range of the receiver. The large wire diameter is important. The greater the wire diameter, the higher is the Q to produce higher loop sensitivity.

I found that, provided the loop aerial was directed towards the source of signal, the signal received was stronger and less noisy using this loop than using my long wire aerial.

Summary

Whilst the simple single tuned circuit regenerative receiver has been discarded as obsolete for high frequency operation, it can provide quite good signal selectivity at very low frequencies. In beat frequency operation (for CW or teletype) its tuned circuit must be offset in frequency to produce the beat note and the disadvantage of this is discussed in the text. Accepting that there is some limitation on its ability to receive weak AM signals and on its ability to reject strong adjacent signals, the receiver described works quite well. These limitations can be largely corrected by using a sharply tuned RF pre-amplifier in front of the receiver. Good performance can also be obtained using a high Q tuned loop aerial system such as that described.

This simple receiver is hardly in the category of a high rating unit but if you are interested in learning a little about what signals appear on the VLF-LF bands, it might be adequate to satisfy your curiosity.

References

1. Lloyd Butler VK5BR - A VLF-LF Receiver 10kHz to 500kHz with Resistance Tuning - *Amateur Radio*, Dec 1989.
2. Lloyd Butler VK5BR - A Front End Tuner for the VLF-LF Receiver - *Amateur Radio*, Nov 1990.
3. Lloyd Butler VK5BR - VLF-LF and the Loop aerial - *Amateur Radio*, Aug 1990.
4. Gilbert Griffith VK3CQ - Audio Filter - Pounding Brass - *Amateur Radio*, Feb 1989.

Note: References 1,2 & 3 are also reprinted in the 1991 Winter and Spring issues of USA journal *Communications Quarterly*..

ar

ELF and Epidemiology

BILL TOUSSAINT VK6LT
9 DESFORD CLOSE SHELLEY 6155

"Epidemiology is the study of the patterns and causes of diseases in the human population. Writing as a fellow amateur, VK6LT takes a careful look at current research into the health effects of Extremely Low Frequency (ELF) electromagnetic radiation, in particular from power distribution. He shows that there is more than one point of view about this controversial topic..."
The purpose of this article is to give a brief description of some techniques used in epidemiology in determining whether or not there are health effects arising from a particular agent (such as Extremely Low Frequency — ELF). In particular one of the basic statistical techniques used in some studies will be dealt with. Where applicable, the "Case-Control" study of electrical wiring configurations and childhood cancers by Wertheimer and Leeper (1979) will be used as an illustrative example.

Background

THERE HAS BEEN A LOT written on the possible harmful effects from Extremely Low Frequency, usually associated with fields from power lines. Some articles which review scientific studies on the effects of ELF are quite definite about the links between harm and ELF. In some instances the reviewers have been more definite in their claims than the original scientific researcher whom they were reviewing.

Thus one often reads that "there is growing evidence" about the links between ELF and childhood cancers. I am not quite sure it is correct to say that "there is growing evidence". Perhaps it is more accurate to say there is a "growing awareness" that there *could* be a link.

It is thus advisable to read the *original* scientific studies (as published in reputable scientific journals) to see exactly what the authors have concluded. This may often be difficult, due to the complexity of the study and the reader's lack of familiarity with the topic covered.

The tools used to establish links between such things as ELF and harm to health are basically epidemiological studies and biological experimentation (often on animals).

In the case of biological experiments, work is being done by several researchers, including Dr Ross Adey (an Australian working in the USA), and readers are referred to his and other scientific publications (Adey, 1988).

The purpose of this article is to deal with one of the basic statistical techniques used in an epidemiological "Case-Control" study.

Epidemiology

Although there are formal definitions of epidemiology, it is essentially the study of the patterns and causes of diseases in human populations. Epidemiological studies can be both descriptive (patterns of disease) and analytical (causes of disease).

Analytical epidemiological studies have been used to try to determine whether ELF is associated with an increased occurrence of childhood cancers. For instance, Wertheimer and Leeper (1979) looked at childhood cancers in relation to electrical wiring configurations. In this study, the authors classified the wiring used to distribute electricity to homes as High Current Configuration (HCC) or Low Current Configuration (LCC). These broad classifications were made on the basis of the likely current flow in the distribution lines.

For a current carrying conductor, the electric field is dependent on the voltage and the magnetic field depends on the current. Thus, for a given wiring configuration, the electric field is reasonably constant, while the magnetic field varies with the amount of current flowing.

HCC and LCC are measurements of *exposure*. Analytical epidemiological studies also aim to measure *outcome* (eg death due to cancer) and to compare exposure in those people with different outcomes, or to compare outcomes when exposure is known.

One strategy used in epidemiology to measure exposure and outcome is the so-called "cohort study". The cohort study measures outcome when exposure is known. In this type of study a large group of individuals (a cohort) is selected and classified according to whether or not each person has been exposed. For example, if it were possible, we could randomly select a large number of people and classify them according to whether they lived near an HCC or an LCC. We could then follow their health progress for their entire lifetime (assuming they did not change their address and hence their classification) and "see" if the HCC group had a greater rate of disease outcome (eg cancer) than the LCC group.

While this strategy has a reasonable degree of accuracy, there are some obvious drawbacks, including the expense of such a study and the great deal of time that elapses before meaningful data are available (eg waiting for people to get cancer or to die from cancer).

Another type of strategy is the "Case-Control" study. The case-control study measures exposure when outcome is known. This technique may not be as accurate as the cohort study in determining risk but results can be obtained in a much shorter time and it is less expensive to carry out. The technique basically involves identifying persons with a specific outcome, for instance, those who have died of a particular disease (the cases) and matching each case with a similar person (or control). The cases and controls can then be compared to "see" if there were differences in exposure to a particular agent.

As Wertheimer and Leeper (1979) used a case-control strategy for their study, it will be useful to go through some of their techniques to illustrate just what is involved. The cases consisted of all persons (under 19 years old) who had died of cancer in Colorado in the period 1950-1970 and had a Colorado birth certificate and address in the greater Denver area in 1946-1973. Controls for these cases were the next Denver area birth certificates, chosen by birth month and county and also others from the alphabetical list

of Colorado births. Ideally, the controls should represent the same population as that from which the cases were drawn.

There were 109 cases who had a stable residence before death from cancer, that is, they lived at the same address from birth to death. This meant that the degree of exposure to any agents was more likely to be consistent over their lifetime compared with someone who was constantly "moving house". These cases were age-matched with 128 persons who were still alive and who had not moved house since their birth.

Having established the cases and controls, the authors then classified them according to whether they lived near an HCC or LCC. Of the cases, 48 were classified as living near an HCC and 61 lived near an LCC. Of the controls, 26 lived near an HCC and 102 lived near an LCC.

For convenience, this classification is often presented as a "Contingency Table" such as illustrated in Table 1.

Table 1 — Contingency Table

Residence Near	Cases (%)	Controls (%)	Totals
HCC	48 (44%)	26 (20%)	74
LCC	61 (56%)	102 (80%)	163
Totals	109 (100%)	128 (100%)	237

From the contingency table, when the numbers are expressed as a percentage, it "looks" as though a greater proportion of cases than controls lived near an HCC (44% vs 20%), but this could just be due to chance. We need a statistical test of the likelihood that this is due to chance.

To assess the role of chance we calculate the "expected" numbers (Xe) in the contingency table. The "expected" number is based on the assumption that there is no effect of wiring configurations on death due to cancer. This can be calculated from the formula:

Xe = row (total) * column (total)/overall (total)

Thus, the expected number (Xe) for the first column and first row of the contingency table is:

Xe = 74 * 109/237
=34.03
ie 34 (if rounded to whole numbers)

Table II shows the contingency table with the expected numbers in brackets.

Table II — Contingency Table with Expected Values

Cases	Controls	Totals	
HCC	48(34)	26(40)	74
LCC	61(75)	102(88)	163
Totals	109	128	237

It is now necessary to see just how different the actual numbers (Xa) are from the expected numbers (Xe). Are these numbers drawn from the same population, or is there very little probability of this? This can be done using a "chi-squared" test.

Briefly, the technique requires us to form a so-called "Null Hypothesis". In this case, the null hypothesis is that there is no difference between cases and controls as far as HCC and LCC exposure is concerned. We can then "accept" or "reject" the hypothesis at a predetermined level of significance (usually 5%). That is, if there is 5 percent chance (or less) that the observed numbers could come from the same population as the expected numbers, we will reject the null hypothesis and conclude that the observed and expected numbers come from different populations. In effect, we conclude that the difference between the observed and expected numbers has, at most, a one in 20 chance (5%) of being due to chance.

The differences between the actual numbers and the expected numbers are used as a basis to calculate a "chi-squared" value. A parameter known as the "number of degrees of freedom" (DOF) is also required. On the basis of the number of degrees of freedom and the calculated "chi-squared" value, a table (which represents the area under the chi-squared curve) can be consulted. If the chi-squared value calculated is greater than the value from the table, we reject the null hypothesis and conclude that the difference between the observed and expected numbers is unlikely (ie less than 5%) to be due to chance.

As we have seen, the expected value is given the symbol Xe. The actual value is denoted Xa. Thus, for the first element in the contingency table, Xa=48 and Xe=34.

2. The chi-squared value is found by summing all values of $(Xa-Xe)^2/Xe$.

This is shown in Table III.

Table III - Chi-Square Determination

Xa	Xe	$(Xa-Xe)^2/Xe$	Yates Correction $(Xa-Xe-0.5)^2/Xe$
48	34	5.74	5.34
26	40	4.88	4.54
61	75	2.62	2.42
102	88	2.22	2.06
TOTALS (Chi-squared)		15.46	14.36

From Table III, the value of chi-squared is 15.46. It is also possible to compute chi-squared using a correction for small numbers. This is known as the Yates' correction. If the Yates' correction is applied a value of 14.36 is obtained for chi-squared.

The number of degrees of freedom (DOF) is found from the formula:

DOF = (number of rows – 1) x (number of columns – 1)

Thus, in this instance, the number of degrees of freedom is 1.

When the chi-squared table is consulted for the above data, it turns out that the value of 14.36 corresponds to an insignificant area under the chi-squared curve. The interpretation of this is that the null hypothesis should be rejected. This means, in effect, that there *is* a high probability that there is a difference between cases and controls in terms of HCC and LCC classification. Expressed another way, a greater proportion of those who died of cancer had a residence near a HCC compared with those still alive. Also, the chi-squared test tells us that the possibility of this occurring by chance is most unlikely.

Conclusions

Just what can be inferred from such a study? Can we say the HCC *caused* the cancer? Not really. We *can* say that in *this* study for Denver, there appears to be a correlation between HCC and cancer deaths. It may turn out, however, that there could be other factors which can account for this correlation. For example, the HCCs might also be associated with busy highways where there are higher than normal levels of lead in the air (Gordon, et al 1990). We don't have enough information to *know* the cause, only to be aware of the possibility of some link. This awareness should be enough to recommend further research, and perhaps a cohort study.

It is worth bearing in mind that no magnetic fields were actually measured in the Wertheimer-Leeper study. The HCC and LCC classifications were based on average likely magnetic fields in the absence of actual in-house measurements.

Caution should also be used when interpreting the results, for although the "number crunching" is valid (it is so easy to do statistics these days with the various computer packages which are available), there are many sources of potential error, such as in the choosing of controls and so-called "confounding" errors (ie effects of additional variables that might be responsible for the apparent association).

In a review of some of the latest research, Repacholi (1990) discusses a similar case-control study done in New York by Stevens (1987). The Stevens' analysis indicated that there was no association between HCC and cancer. When Wertheimer and Leeper later regrouped the data, however, a weak linkage was indicated. This post-study analysis was, in turn, later criticised by the original researcher (Stevens)

The point I am trying to get across is that there is currently no simple "black" or "white" answer to the question of whether ELF is "dangerous" or not. The

early epidemiological studies have told us that there is a possibility of some association between ELF and cancer and that therefore more detailed research is required. This is now occurring and we will be able to make better judgements in about four years time when more research results are to hand.

Some researchers (such as D Savitz, as quoted in the press) have indicated that the preliminary results indicate that if there is any association between ELF and cancer, it is likely to be weak.

Research into the effects of ELF is reviewed by an international body of expert members who form the International Non-ionising Radiation Committee (INIRC, 1990), under the auspices of the World Health Organisation (WHO). This committee has formulated guidelines for public and occupational exposure to ELF fields. For public exposure up to 24 hours per day, these guidelines are 5kVm^{-1} for the electric field and 0.1mT for magnetic flux density.

Thus, in order to keep informed on this matter, it is advisable to read the INIRC guidelines. Also, where possible, one should read the *original* scientific studies written by the scientists who have actually carried out the research work published in reputable scientific journals.

Acknowledgement

I would like to express my appreciation for the considerable help given me by Dr Heath Kelly on the epidemiological aspects in this article.

References

Adey, W R (1988). Cell Membranes: The electromagnetic environment and cancer promotion. *Neurochemical Research 13: pp 671- 677.*

Gordon, I, Motika, M. and Nolan, T. (1990). Epidemiological studies of cancer and powerline frequency electromagnetic fields: A meta-analysis. *University of Melbourne Statistical Consulting Centre. Report No. 242.*

INIRC/IRPA (1990). Interim guidelines on limits of exposure to 50/60 Hz electric and magnetic fields. *Health Physics, Vol 58, No 1, pp 113-122.*

Repacholi M H (1990). Cancer from exposure to 50/60 Hz electric and magnetic fields- A major scientific debate. *Australasian Physical and Engineering Sciences in Medicine. Vol 13 No 1, pp 4 - 17.*

Stevens, R G (1987). Epidemiological studies of cancer and residential exposure to electromagnetic fields. Final contractors report to New York State Power Lines Project. *Wadworth Centre for Laboratories and Research. Albany, NY 12201, pp* 50.

Wertheimer N and Leeper E B (1979). Electrical wiring configurations and childhood cancer. *American Journal of Epidemiology, Vol 109, No 3, pp 273- 284.*

ar

More on the Small Transmitting Loop Aerial

Addendum to the Article in November 1991 issue of *Amateur Radio.*

LLOYD BUTLER VK5BR 18 OTTAWA AVENUE, PANORAMA 5041

Anomaly in Formulae

A list of design formulae for the transmitting loop aerial was included in the article. Please note that the formula quoted for the tuning capacitor Ct actually refers to the total capacitance needed to tune the loop and hence the distributed capacitance Cd must be subtracted to determine the capacitance added.

Radiation Pattern

In the text of the article, I stated that I was a little confused at finding the directivity of the loop to be different from that expected. My initial tests were carried out by moving an oscillator source around the loop and observing the output level change in a receiver connected to the loop. The signal was radiated directly from the oscillator tuning coil and I have since realised that this gave an anomalous result. Normal response from a small loop is maximum signal in line with the plane of the loop and minimum signal at right angles to that plane. I have more recently assembled a field strength measuring instrument using the rod as an aerial. I am pleased to report that using the rod in the vertical plane, the measurements conform to this pattern and there is no longer any confusion.

It is interesting that at a radiation angle of 0 degrees, the radiation pattern is bi-directional with vertical polarisation. Two sharp nulls occur at right angles to the plane of the loop but these gradually disappear as the radiation angle is increased. At 90 degrees, the radiation pattern is almost non-directional with horizontal polarisation. At intermediate angles, there is a mixture of both vertical and horizontal polarisation.

Response Close To Ground

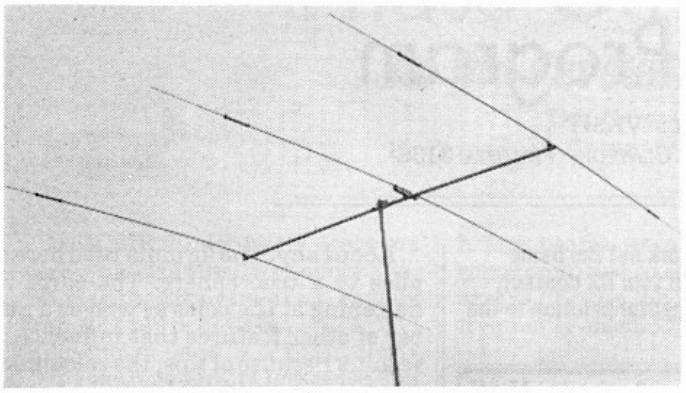
Trevor Smith VK2ECU sent me a copy of an article on the early Army Transmitting Loop written by Kenneth H Patterson in *Electronics*, August 1967. This draws attention to a very important feature of the loop. A horizontally polarised wave reverses phase when it is reflected from the earth. Because of this, the ground reflected wave tends to cancel the direct wave and hence a horizontally polarised aerial mounted near ground level has very poor low angle radiation. On the other hand, a vertically polarised wave does not change phase on reflection and it reinforces the direct wave. At low radiation angles, a loop aerial is vertically polarised and hence it can be mounted close to the ground and still give good low angle radiation. A good low conductivity ground might even improve the low angle signal.

So here is an added bonus. Not only is the transmitting loop physically small but it does not need to be mounted on a high mast or tower. In fact it could almost be mounted in any reasonable position and give good performance radiating both high and low angle radiation with a mixture of both forms of polarisation.

ar

TET-Emtron

ANTENNA SYSTEMS



ONLY $450 100% MADE IN AUSTRALIA

THE ED 5-2C MULTI BAND TRAP ANTENNAS

Only $159

- Completely factory assembled ready to use • Handles 2 kw PEP & covers 80 through 10 metres.
- Heavy 14 (7/22) gauge standard copper antenna wire to survive those severe storms.
- Centre fed tuned feedline supplied
- Includes centre insulator with an eye hook for centre

NEW

TET — EMTRON

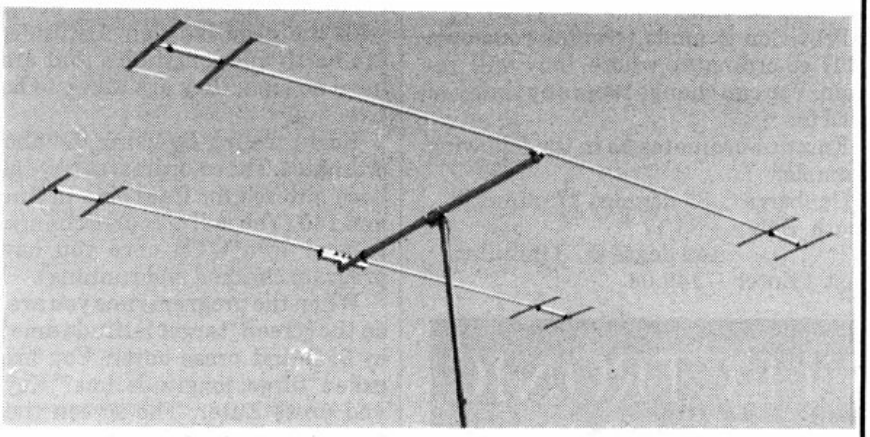
Model **TE-33**

The "TET-EMTRON" model TE-33 is an optimum performance 3 element HF Beam Antenna. New high efficiency traps, all stainless steel hardware and rugged aluminium construction guarantee, long and trouble-free operation. As trap type antennas are generally considered narrow banded, the TE-33 gives a SWR of 1.5 or less across the entire operating band, and therefore does not need any readjusting for Phone or CW band. The antenna is made from specially hardened aluminium, all predrilled and partly pre-assembled components — THIS ANTENNA IS MADE TO LAST.

Band	14, 21, 28MHz
Gain	6, 6.2, 7 dBd
F/B Ratio	21, 15, 16 dB
Power	2 KW PEP
Max Ele. Length	f.3m
Weight	12.5kg

NEW

THREE BAND MINI-BEAM TE-33M



THIS NEW MINI BEAM IS JUST THE THING FOR THE HAM WITH INSUFFICIENT SPACE FOR A FULL SIZE TRIBANDER WITH A 5 METRE SPAN ONLY. THIS ANTENNA IS AN EXCELLENT PERFORMER! **PRICE $375**

FREQUENCY	14 21 28MHz		
ELEMENT LENGTH	5.0m	BOOM LENGTH	2.0
GAIN	4/6/6 dB	FRONT TO BACK RATIO	12-20dB
FEED IMPEDANCE	50ohm	TURNING RADIUS	2.74m
WIND SURFACE	0.25m	WEIGHT	9.1kg

VSWR 21 28MHz less than 1.5:1 across band
14MHz 150 kHz less than 1.5:1
250 kHz less than 2.0:1

DATA PRODUCTS Low-cost

WE HAVE SOLD OVER 1200 PK-232 MBX — THE WORLD'S BEST MULTI-MODE DATA CONTROLLER

PK-232MBX Multi-mode Data Controller:

Most popular multi-mode controller ever made; RS-232 compatible controller for Packet, Baudot and ASCII RTTY, AMTOR/SITOR ARQ and FEC. Morse code and WEFAX; also receives NAVTEX/AMTEX and TDM; superior CHEBYSHEV filter design for better copy; built in 18K byte PakMail™ personal packet maildrop with auto forwarding; SIAM™ for automatic RTTY signal identification; KISS mode for TCP/IP compatibility; Host Mode for user-friendly software interface; cables and connectors included..... **$640**

NEW

model TNC-24 Mk II from TELEREADER!

ALL MODES IN ONE!

INTRODUCING UNIQUE AND MOST ADVANCED NEW MACHINE FOR SOPHISTICATED OPERATORS.

FSK (1200, 300bps), PSK, JAS-1, RTTY, FAX — RX ONLY ★ BUILT—IN PSK & JAS — 1 MODES FOR SATELLITE COMM. ALL MODES IN ONE!

ONLY $695

PACKET RTTY CW AMTOR FAX
ALL IBM SOFTWARE INCLUDED

PK-88™ Packet Controller

Improved hardware and software design make the PK-88 your best choice for a packet-only controller. Integrating the popular packet software from the multi-mode PK-232 with a special AEA TNC hardware design gives you the best of both worlds.
WRITE FOR MORE INFO **$299**

BANKCARD MASTERCARD & VISA

EMTRONICS

MAIL ORDERS WELCOME

HEAD OFFICE:
92-94 Wentworth Ave, Sydney
NSW 2000. TLX: AA73900
PO Box K21 Haymarket, NSW 2000
Ph: (02) 211 0988
Fax: (02) 281 1508

PARRAMATTA
7 Smith St,
Parramatta
Ph: (02) 687 2210
(02) 687 2211

VICTORIA
288-294 Queen St, Melbourne
Vic 3000
Entrance from Lt Lonsdale St
Ph: (03) 670 8551 or 670 0330
Fax: (03) 670 0671

QUEENSLAND
416 Logan Rd,
Stones Corner,
Qld 4210
Ph: (07) 394 2555
Fax: (07) 394 4316

WESTERN AUSTRALIA
336 Albany Highway,
Victoria Park WA 6100
Ph: (09) 470 1118
Fax: (09) 472 3795

A Great Circle Distance Program

W MIDDLETON VK3IT
22 BELMONT ROAD, SOUTH CLAYTON, VICTORIA 3136

If you have a need to work out the beam heading and distance to your DX contact, VK3IT has a simple computer solution to the problem.

GIVEN THE LATITUDE AND longitude co-ordinates for any two places on earth, this program will calculate the distance between them and the bearing from one to the other with reference to true north.

Degrees minutes and seconds (dms) are keyed in and converted to radians as the program runs.

Provision is made to enter your own QTH co-ordinates where they will remain. You can change them any time you need to.

Enter co-ordinates as in the following example:

Canberra 35 degrees 17 minutes South Enter – 35.17
149 degrees 8 minutes East Enter – 149.08

London 51 degrees 30 minutes North Enter 51.3 . 6 minutes West Enter .06

NB: All latitudes that are south and longitudes that are east are designated with the negative sign. Latitudes that are north and longitudes that are west have no sign; they are taken to be positive.

Begin testing by using the above co-ordinates. The co-ordinates have already been entered for Canberra in lines 110 and 140.(You will of course change these to your own QTH once you have the program checked and running).

When the program runs you are asked on the screen "target latitude dms ?" Key in 51.3 and press enter. You are then asked "target longitude dms?" Key in .06 and press Enter. The screen then displays "Distance in kilometres" 16969.0855 followed by "Bearing degrees" 316.016713.

(This degree of precision is not justified by the input data - Ed)

If everything checks out, you can now type in your own QTH co-ordinates in lines 110 and 140 and proceed to select any target (destination) you wish.

Definitions

Formula:
cos d = (sin a sin b + cos a cos b cos f)
cos c = (sin b - sin a cos d) / (cos a sin d)
a = QTH latitude
b = target latitude
longs = QTH longitude
longf = target longitude
f = target longitude minus QTH longitude (longf - longs)
d = distance along the path in radians of arc
c = bearing from north if sin f is negative otherwise bearing is 360 - c degrees (line 270)
dms = degrees minutes seconds
north and west dms are positive, south and east are negative.

Accuracy: The formula used here applies to a true sphere. The earth has flattening at the poles as well as a number of other features that influence the result.s Because of this, the calculations can result in an error of up to 0.5 per cent.

The results apply to terrestrial distance and direction. In reality, a radio wave will skip over a much longer distance and its direction will deviate at times, off course due to ionospheric conditions.

Nevertheless the program should meet the needs of most radio amateurs except possibly when claiming a VHF-UHF record.

Caution: When typing in the long line 270 be sure not to press the Enter key until the **whole line** has been typed in.

Take care in typing punctuation marks and brackets.

```
GL es 73.
Print "Distance and Bearing Program GRTCRCL.BAS 910616".
110 n = -35.17
120 GOSUB 300
130 a = t
140 n = -149.08
150 GOSUB 300
160 longs = t
170 Input "target latitude dms"; n
180 GOSUB 300
190 b = t
200 Input "target longitude dms";n
210 GOSUB 300
220 longf = t
230 f = longf-longs
240 d = ACOS((SIN(a)*SIN(b)+COS(a)*COS(b)*COS(f))
250 c = ACOS((SIN(b)-SIN(a)*COS(d))/(COS(a)*SIN(d)))
260 Print "Distance in kilometres"d*6366.70702
270 If SIN(f)<0 then print" Bearing degrees"c * 57.2957795 else print "Bearing degrees"360-c *57.2957795
280 End
290 Rem: Subroutine to convert degrees minutes seconds to radians
300 u = FIX(n)
310 v = n-(u)
320 w = ROUND(v,7)
330 x = w*100
340 y = FIX(x)
350 z = (x-(y))*100
360 t = (u*3600+y*60+z)/206264.806
370 Return
```

ar

Two Half Waves in Phase On 30 metres

An Old Favourite Resurrected.

DES GREENHAM VK3CO
16 CLYDESDALE COURT, MOOROOPNA, VICTORIA, 3629.

IT IS SOME TIME NOW since we were granted a small frequency allocation in the 30 metre band, namely from 10.1 to 10.15MHz.

The 30 metre band is a particularly good band with generally low noise and ideal propagation characteristics for communication covering the Australian continent.

Many people have attempted to use 30 metres by tuning their existing 40 or 80 metre dipoles using an antenna tuning unit, with doubtful success.

Perhaps the simplest resonant antenna is the basic dipole constructed from wire and fed with normal coaxial cable such as RG-58 or RG-8 direct or via a 1/1 "Balun" transformer. Either way this works well and will provide good results. The antenna length should be 14.02metres (46 ft) overall with a small insulator in the centre to provide the feed point. See figure 1.

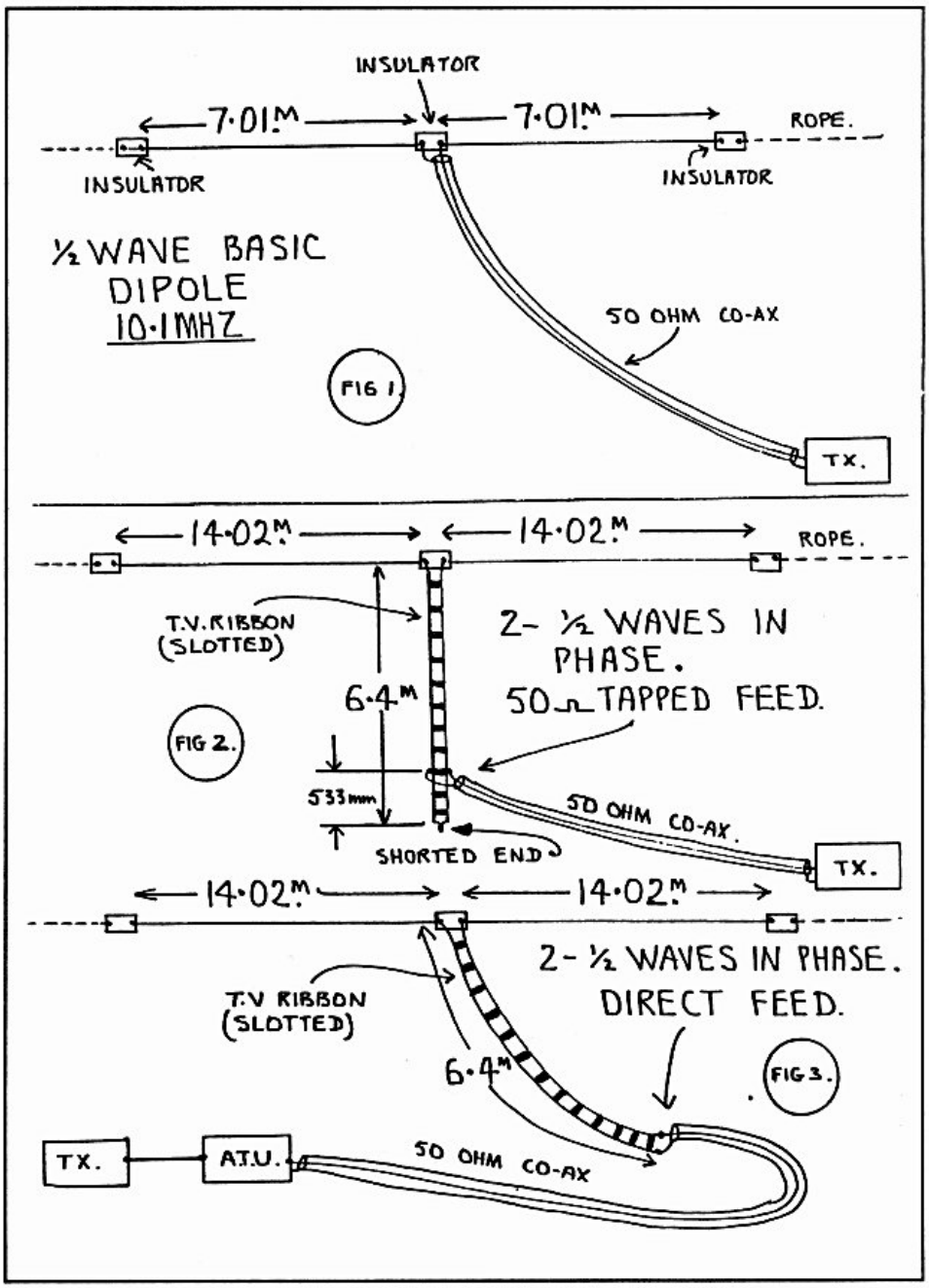
The antenna length can be adjusted symmetrically to achieve a 50 ohms centre impedance match. Alternatively, an antenna tuning unit can be used to produce a 50 ohm load for the transceiver.

It should be appreciated that the "natural" impedance of a dipole can also vary over a wide range depending on antenna height. Textbooks suggest it can be from 30-120 ohms with the "true" average impedance around 75 ohms.

Nevertheless, either way will give good results on this band. This was proved last year when a regular "net" on 10.120MHz was maintained every afternoon between several base stations in Victoria and NSW, and mobile winter tourists travelling north to Cairns. For the entire winter there was not one day when we could not receive good signals from all stations.This year we have started our net again as the first of our migratory "Mexicans" wend their way to Far North Queensland to enjoy the winter warmth.

In an attempt to improve signals from Victoria to Far North Queensland, your scribe, a very old-timer, decided to explore what could be done to achieve some antenna gain with the minimum of cost.

Back in the early days, just post-war before beams were the fashion, it was common to use fixed wire beams on HF arrays like the W8JK, Lazy H, etc were frequently used. One popular antenna with reasonable gain and simple construction was the "2 Half Waves in Phase" system. This is a particularly simple antenna producing some broadside gain



and yet not too directional to prevent general coverage. It was decided to try this out on 30 metres. In "olden times", we always used spaced wire feeders to feed the antenna - these were commonly known as "Zepp" feeders and used wooden or plastic spreaders. Today, with slotted plastic TV ribbon being readily available and cheap, it was decided to use this product. Not knowing the propagation factor of slotted ribbon, the theoretical quarter-wave length of 7.01m (23ft) was cut and then coupled to a Dip Meter to check the correct length for a quarter-wave. It was found that the correct length is 6.40m (21ft). This is connected as a stub at the centre of the two half-wave antennas and with the end of the TV ribbon shorted, we have our complete "2 half waves in phase" array. In the old days we would feed this antenna using a series resonant tuned tank circuit and link coupling to the transmitter. Today, with SWR meters and 50ohm coaxial cable being generally used, it was decided to move the feed point up the quarter-wave section and find, by experiment, the 50ohm point. (Fig 2). After a considerable time and with large quantities of TV ribbon chopped up and mutilated, the correct point was found!! This point is 533mm (21") from the bottom or shorted end. At this point the SWR was approximately 1.3 over the 10MHz band. This point is "50ohms" in this particular case, but will vary considerably with antenna height. At this location, the antenna was horizontal but only seven metres above ground. For different heights, the matching point will have to be found experimentally. The performance of the antenna is very good with reports generally being 2-3S points stronger than the original dipole antenna at the same height. For those who possess a good antenna tuning unit and do not wish to experiment with the tapping point, the coaxial cable can be fed directly into the end of the TV ribbon. (Fig 3).

The ATU can then transform the impedance to 50ohms for the transceiver. Performance either way has been compared and found to be substantially the same. With an antenna of this type there are a few precautions that must be observed. The TV ribbon quarter-wave section is NOT operating in its "300ohm" mode. It is a 10MHz transformer with low impedance and high current at the bottom, and high impedance, high voltage, and low current at the top.

It must be kept clear of metallic objects and kept out in the clear. If it needs to be supported anywhere, TV type stand offs should be used. The theoretical gain of the antenna is 3-6dB depending on what reference is used. In practice, reports prove the antenna to be very effective. It is easily constructed with no major capital outlay!!

ar

Antenna & Ionsphere in Partnership.

ROBERT R MCGREGOR VK3XZ 2 WILTSHIRE DRIVE, SOMERVILLE, VICTORIA, 3912

HAROLD VK3MI MADE a fine contribution (*AR-91*) in so clearly outlining what radiation pattern is achieved with a low horizontal antenna and thus, on 80m, good coverage for the important 500km radius area; the one in which any amateur is most likely to be involved in an emergency.

The radiation resistance of Hertz (dipole) antennas falls to a low value as height is reduced and can be difficult for a feeder to match. There are however, alternatives. From these I suggest the 3/4 wavelength consisting of a half wave horizontal section connected to a 1/4 wave vertical section and tuned against ground. For this application the vertical section can be reduced to 1/8 or 1/10 wavelength. This section will also radiate at a 10 to 50 degree vertical angle, filling in where the horizontal section radiation diminishes.

This arrangement is a short antenna to be tuned against ground, series L. As Harold so truly remarks, earth systems are very variable. Typically there would be 10ohms radiation resistance, 10ohms resistance in the series L and 30ohms in the earth - these are poorish figures. Efficiency, 10/(10+10+30) = 20%, ie — 7dB, a definite 'S' point. Matching? This example produces (conveniently) 50ohms, BUT, in reality you must tune the antenna,

"Here are some more antenna ideas from VK3XZ, which remind us that dipoles are not the only solution to antenna problems.."

it is not broadband.

The total resistance can be 'trimmed' for better feeder matching by adding series or shunt resistances. For modest differences a series 10ohms would compensate for a better ground (at the expense of some efficiency).

Sand and clay locations can benefit from insulated radials. Best results are with 1/4 waves but I found that even 20 or 30 feet assisted on 160 and 80. Reel them in for lawn cutting and especially on wash days! Materials? Well I used some split "figure of 8" flat twin. However, the outer shield of old coax, salvaged house wiring or damaged flexibles will perform okay.

For those on salt marshes or on boats, Ron VK3AFW describes how to construct matching transformers for low ratios in *AR* May 91. Using a 4:5 ratio of turns gives an impedance ratio of 16:25; or approximately 1:1.5. This will match 30 to 45ohms, reversed, 75 to 50ohms. It does require winding a bundle of 9 wires which do not group very well. Making up 3 groups of three wires and then twisting these groups together could be easier. When selecting the wires to series be sure to include at least one wire from each 'three'. Another approach is to wind each 'three' on 120 degrees of the toroid. This method would simplify the series connections. What is your verdict, Ron + Ron?

Now for some suburban and traveller's specials :-

Try a 20m top with a 5m vertical section. Use series C to tune 40 and series L for 80; more L for 160. On 20 the top is a full wave 1/4 wave above earth with the classic pattern plus that for a 1/4 wave vertical. This antenna can be tuned up on any wavelength but certain frequencies could send you back to the handbook for technical refreshment!

Construction? Most suburbanites have at least one 20m fence. Three fishing poles will provide a 'flat' top. Angle the vertical section as a guy and use a cord at the other end. No wire please! This is not gale resistant but the wind is slower at 5m! It is readily packed for transport and can be carried over ditches, fences or down to the beach.

If your interest is in something smaller, a 10m top and 5m vertical can have a part trimmed for zero reactance on your frequencies. For use on land rather than on a boat, carry three 5m radials to spread around the earth pin. Always use an earth pin for static drainage and to provide a 'DC' earth for the rig. Don't forget the series C for 40 or the L for 80 — Happy travelling and a safe return. **ar**

A 24 Hour EST/UTC Clock

TONY ZUIDERWYK VK3ZMP
75 WILLIAM HOVELL DRIVE
ENDEAVOUR HILLS, 3802

A CLOCK IS ONE OF THE few station accessories that may be classified as essential. A clock suitable for the purpose should be reasonably accurate, easy to read and provide an indication of local and UTC time in 24 hour format. In addition I required a clock to be mains independent for field days and blackouts and not to cause any RFI as some multiplexed digital displays do. The clock to be described satisfies these requirements and has the added bonus of being homebrew.

This project is based on a 24 hour version of the analogue quartz clock modules available from most electronic component suppliers. These modules are powered by a 1.5 volt size AA battery and come complete with a range of hands. All that is needed is a clock face and a suitable enclosure.

A 24 hour clock face is reproduced, actual size, in figure 1. The dimensions of the face allow the use of a Horwood type 34/3/D instrument case measuring 100mm x 75mm x 75mm. Figure 2 is the UTC conversion face that fits concentrically with the figure 1 face. Together they provide a quick conversion between EST and UTC, in this case a 10 hour shift; summer time requires the inner UTC face to be rotated one hour.

The following steps may be used as a guide to assembly of the project:

1. Select one of the removable panels to be the front face and drill a 10mm hole in its centre.

2. This front face panel needs to be recessed into the case approximately 18mm to allow the installation of a perspex dust cover and clearance for the hands. Four new countersunk holes in the case and matching screws will be required to secure this panel.

3. Figure 1 and 2 need to be photocopied and cut out to size. Laminating the paper with clear Contact will give the faces added body and permanence.

4. The clock hands supplied should be cut to 23mm for the hour hand and 29mm for the minute and second hands. The width of the hands need pruning to approximately 2mm.

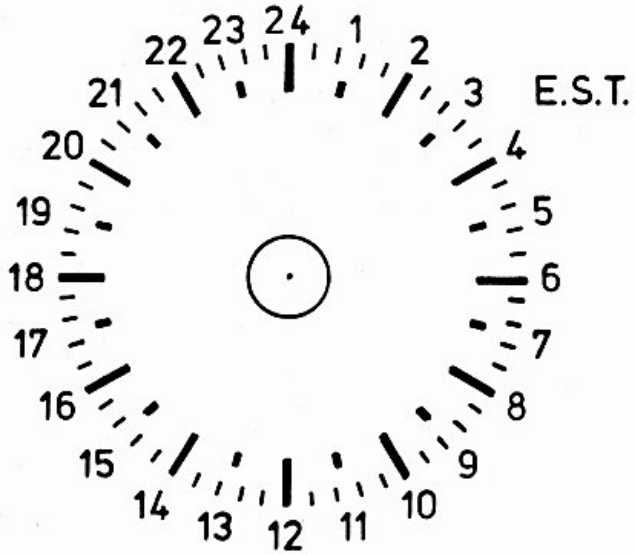


FIG. 1

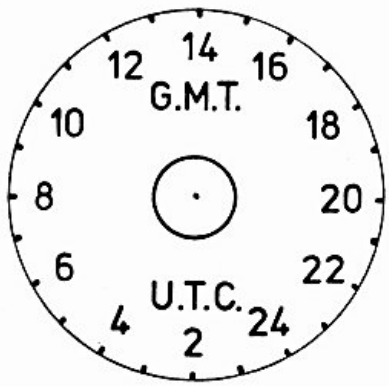


FIG. 2

5. An optional perspex dust cover may be cut to fit just inside the front of the extruded aluminium case and shallow tapped secured holes provided to coincide with the existing holes in the case.

6. Final assembly requires a 4mm spacer between the clock module and the rear of the front panel. This may be fabricated out of scrap aluminium and a 10mm hole drilled to clear the module's mounting bush.

Finishing and refinements are left to the individual constructor. I found that covering the case with black Contact resulted in a professional looking finish.

Reading the time on an analogue 24 hour clock can be a bit confusing at first as the relative positions of the hands are different to the more familiar 12 hour clock face. Mastering the skill, you might say, takes a little time!

ar

Sniffer for Two-Metre Fox Hunting

IAN STIRLING VK3MZ
169 GLENDALE RD, RINGWOOD NORTH 3134

THE MOST EXCITING part of hidden transmitter direction finding or fox-hunting is closing in for the kill. This is where a lightweight beam antenna and simple receiver are required to perform the close in DFing, and is frequently performed on foot. This article describes a simple receiver, which may be used in conjunction with a two or three-element beam for the last few hundred metres of DFing a 2m band transmitter.

Over the past 10 years of participating in the monthly Melbourne fox-hunts I have experimented with numerous sniffer receiver designs. I have also received many requests for sniffer circuit boards. With the growth in popularity of fox-hunting the demand for sniffer boards seems never-ending and I am regularly asked if I can supply "just one more board". To satisfy this demand I have had a quantity of PCBs produced by a commercial PCB manufacturer. Ordering details are given at the end of the article.

The requirements of a sniffer receiver are to provide sufficient sensitivity to allow DFing a 2-watt fox from up to, say, 500 metres away, but with sufficient gain control to permit DFing to within a metre or less of the transmitter. This design achieves this by having an RF gain stage and a large amount of post detector audio gain. Minimum discernible signal level is below 20µV. The gain of the RF and audio stages are controlled by a single pot and the amount of gain reduction permits DFing right up to the transmitter.

This receiver also has what is affectionately known as whoopie mode. The detected signal is fed to an audio VCO and, as the antenna is waved about, the VCO will give a whooping sort of noise. The highest pitch indicating the direction of maximum signal strength and the direction to run in. The regular Melbourne fox transmitter is amplitude modulated with a tone, and DFing can be achieved by noting the direction of loudest received tone. In situations where there are multiple signals arriving via reflection paths, the whoopie is able to distinguish the strongest signal, which cannot be done so easily if relying on volume. This is because the human ear is very sensitive to even minor differences in pitch, but fairly insensitive to small differences in volume. The whoopie mode gives a clearer indication of the beam maximum and is also used if the fox transmitter is an unmodulated carrier.

This design has been given the label Mk2, because it is a development from a design that I distributed to other foxhunters through the North Eastern Radio Group. Over 50 of the Mk1 PCBs were made by the NERG, and requests were received from amateurs in all states and NT. Suggested improvements have been incorporated in this version. The updated design requires only a single 9v battery, does not require coil formers and it all goes on a single-sided PCB which is a little smaller than the previous design.

Circuit Description.

The stage associated with Q1 is an RF amplifier. The gain of this stage is controlled by the voltage of gate 2 in respect to the source. The source is maintained at approximately +3 volts by the zener diode D4. With the wiper of the gain control pot RV4 at the maximum position the voltage of gate 2 is about two volts above the source voltage and the stage has a gain of the order of 20dB. When the gain control wiper is in the minimum position gate 2 is at earth potential and therefore three volts negative in respect to the source. The stage now has attenuation of the order of 20dB.

RF from the Q1 stage is then detected by D1 and D2, and then amplified by op-amp IC1. The gain of IC1 is also controlled by RV4. The gain of this stage is set by the ratio of R9 to the drain-source resistance of Q2. In the maximum position the gain is of the order of 500 depending on the characteristics of Q2. In the minimum position of RV4 the wiper is grounded and transistor Q2 is approaching cut-off because the current through R10 and D3 biases the gate of Q2 negative with respect to the source which is at about +3.3 volts. The stage gain is thus now approaching unity.

The use of Q2 as a variable resistor enables the RF and AF gain to be controlled by a single gang potentiometer. It also allows component placement flexibility because the potentiometer leads are decoupled, and pick-up of signals on the wires to the pot is not a problem.

The output from IC1 contains tone information if the carrier is amplitude modulated, and a DC component which is proportional to the received signal strength. From here the signal can go straight to the audio power amplifier IC3 for tone reception or via the VCO for whoopie mode reception.

Construction Notes

Assembly is straightforward, as the PCB is screen printed to assist with component placement. The holes are drilled to accept common size components. The order of assembly does not matter but it is usually easier if the low profile components are soldered in first, such as resistors, diodes and IC sockets (if used). Then the capacitors, coils and trimpots. The two coils sit on the board horizontally. Solder the transistors in last and keep the handling of the semiconductor devices to a minimum to avoid static electricity damage. The BF981 is inserted with the writing visible on the top side. Attach hook up wire leads and connect to the off board components such as the switches, gain control pot, antenna connector, battery clip, speaker or headphone socket. Prepare a metal box to accept the hardware and complete the assembly. The printed board assembly and other hardware will just squeeze into a 12 0x65x4 0 mm diecast box but these boxes are expensive and the budget-conscious should look for alternatives.

My 14-year-old son assembled and tested one of these sniffers and used it very effectively at the last meeting. He took about five hours to construct the unit. I expect that more experienced constructors will complete the unit in just a few hours.

Set Up and Adjusting

The input must be terminated by connecting a low impedance source such as

the antenna or a signal generator if one is available. The Q1 stage will oscillate if the RF input is not terminated in a low resistive source. The diodes are sensitive to light, and adjustment must be carried out away from bright sources of light, or the diodes can be painted.

Set the Gain Control RV4 to the maximum gain position, ie fully clockwise. Measure the voltage on D4 in respect to ground. The voltage here should be 3.3V approx. Adjust the offset-null RV1 so that the output on pin 6 of IC1 is the same as the voltage measured on the zener diode D4, a whisker more, if anything. Set switch SW2 to the whoopie position and adjust the VCO threshold RV2 to produce an audio tone of approximately 100Hz. Set SW2 to the tone or modulation position. A hissing sound should be heard.

If assembly and adjustment have been carried out correctly to this point the gain control will have the following effect. With no RF signal applied and the input terminated, switch to the tone position and adjust the RF/AF gain control from counter-clockwise to fully clockwise. The speaker output will go from zero to a definite hissing or white noise sound in the fully clockwise position. In the whoopie position the speaker output will go from the approximate 100Hz as set before, and increase slightly as the gain control is rotated from counter-clockwise to fully clockwise. The RF amplifier can now be tuned for maximum sensitivity.

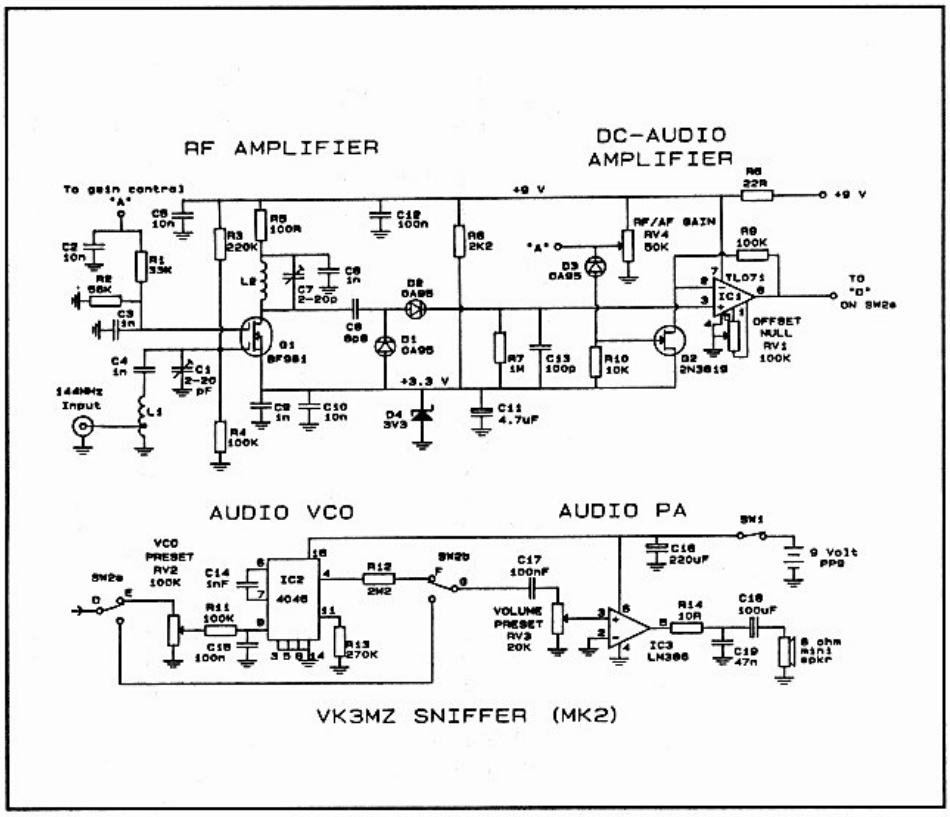
If a signal generator is available then set up an AM signal on 144MHz and peak C1 and C7 for maximum received and reduce the signal to the minimum discernible level and repeat C1 and C7. Verify that the whoopie facility functions correctly by switching the signal on and off. Adjust the volume pre-set to a comfortable level and away you go!

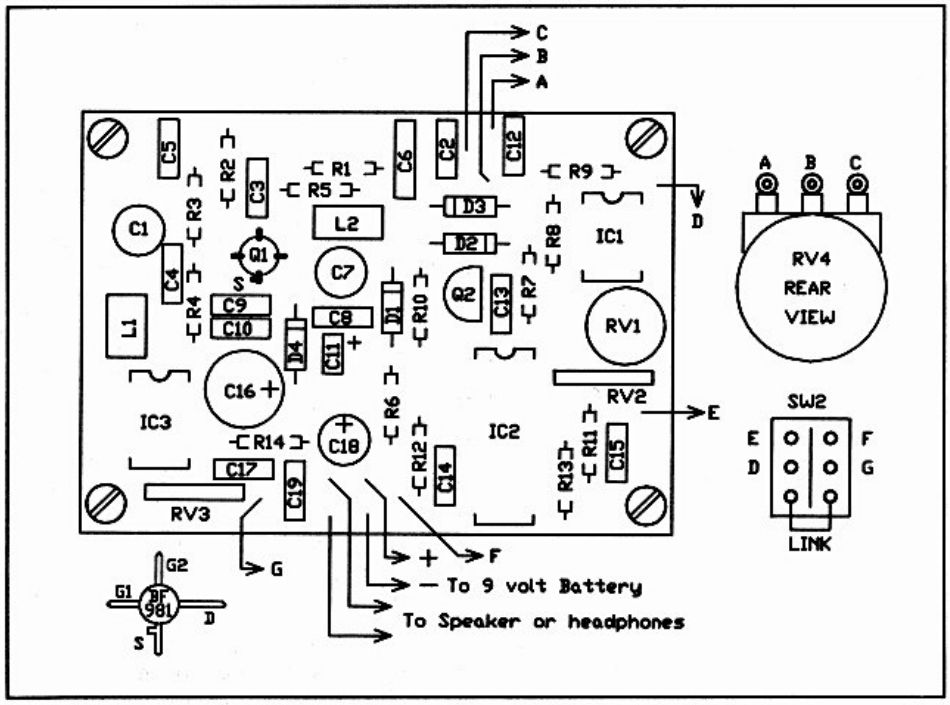
Otherwise, if a signal generator is not available then a hand-held or similar transceiver and an assistant are required. Connect the antenna to the receiver, set the sniffer to the whoopie mode and the gain control to mid position. Key the transmitter and peak C1 and C7 for highest whoopie pitch. Some adjustment of the gain control may be required to allow peaking to occur. Move away from the transmitter to the point where the gain control is at the maximum position and a small increase in pitch is noticed as the transmitter is switched on and off. Repeak C1 and C7 and the unit is now ready for hunting.

PCB Ordering

The PCB is single sided and the dimensions are 77x55mm. The component overlay is screen printed on the top side and the tracks are pre-tinned. The board is fully drilled to accept common-size components.

PCBs can be obtained by sending a remittance of $8.00 and a self-addressed and stamped envelope to to the author at 169 Glenvale Rd, Ringwood North, Vic 3134.





Lay out of Sniffer components on board

Component Sourcing

It is very rare to walk into one component shop and buy all the parts for a project. This project is no exception. I purchased components from the following suppliers: Stewart Electronic Components, 44 Stafford St, Huntingdale 3166. The Electronic Component Shop,

289 Latrobe St, Melbourne, 3000; Dick Smith, 141 Maroondah Hwy, Ringwood 3134.

Parts List

Resistors: 1/4 Watt

R1	33K
R2	56K
R3	100K
R5	100R
T6	2K2
R7	1M
R8	22r
R9	100k
R10	10k
R11	100k
R12	2m2
R13	270k
R14	104

Potentiometers

RV1 100K cermet, vertical adjust (horiz mount)
RV2 100K horizontal adjust (vert mount)
pin spacing 5mm (0.2 inch)
RV3 20K same style as RV2
RV4 50K log pot

Capacitors: Disk ceramic unless otherwise stated.

C1	2-20pF Trimmer, 2 pin, 5mm hole spacing, Philips (red) or Murata (red)
C2	10n
C3	1n
C4	1n
C5	10n
C6	1n
C7	same as C1
C8	6p8
C9	1n
C10	10n
C11	4.7µF, 16V tantalum
C12	100n, monoblock
C13	100p
C14	1n
C15	100n monoblock
C16	220 µF, 16V electrolytic
C17	100n monoblock
C18	100 µF, 16V electrolytic
C19	47n greencap

Inductors

L1 and L2, four-and-three-quarter turns of 20SWG formed on a 5mm or 3/16-inch drill bit. Space the turns evenly to give a length of 8mm. L1 is wound clockwise, L2 is wound anti-clockwise. L1 is tapped one turn from the "cold" end ie, nearest to IC3.

Semi-Conductors

D1, D2, D3 OA95 etc, germanium point contact diode
D4 3V3 400mW zener diode
Q1 BF981 MOSFET
Q2 2N3819 J-FET
IC1 TL071 or LM351 low noise op-amp
IC2 CD4046 PLL
IC3 LM386N-1 audio amp (8 pin)

Miscellaneous

SW1 single pole switch (supply on/off)
SW2 DPDT, slide or toggle switch
Battery clip for 9v battery (PP9)
head phone socket or miniature speaker
Metal box to suit
Antenna socket, hook-up wire, machine screws and nuts **ar**

Back issues of *AR* available to WIA members
10 randomly selected back-issues of our choice, between Jan 1969 and Dec 1987, available for $17.50.

Mini Equipment Review

RON FISHER, VK3OM

THIS MONTH, WE LOOK at another useful accessory from the Dick Smith catalogue. This one is from the Yaesu range and will complement your FT-23/411 and 470 hand held transceivers.

The Yaesu CA-2 Desk Top Stand

What's the first thing that happens when you stand your hand-held transceiver on the desk? I can tell you from experience, it will fall over and either bend your telescopic antenna or scratch your new desk microphone or worse, both of the above.

Well worry no more. Buy yourself a CA-2 Desk Stand. Not only will it stop your hand-held from falling over, it provides a connection to the transceiver from your wall point charger and even has an LED to show that the battery is being charged. If you have an external microphone speaker for your rig you will now be able to connect it up and use it with no fear of pulling the whole thing over. The battery charger plugs into the back of the CA-2 and you only need to drop the hand held in for the charging to start. I liked it so much, I bought one for myself.

The Yaesu CA-2 Desk Top Stand Cat D-3355 is available from most Dick Smith outlets at $39.95.

ar

Snapper Island: Part of Sydney's Maritime History.

CASEY W SCHREUDER VK2CWS
SECRETARY NSW CHAPTER RNARS

THE REMARKABLE HISTORY of tiny Snapper Island began on the morning of 9th September 1914 almost five thousand miles away on the turbulent sea near the Cocos Islands in the Indian Ocean. Two cruisers - the *Emden* of Germany and the HMAS *Sydney* of Australia engaged one another in battle. When the pall of combat cleared the *Emden*, after several hours of battle, lay in ruins on the rocks. Its victor became the first of the Royal Australian Navy to engage an enemy in battle.

It has been described as the last gentlemanly sea battle. When it was over the officers and crew of the German ship were transported to the *Sydney* without scorn or ceremony and, in the best storybook fashion, the Australian Captain put his arm around his counterpart's shoulder and allowed him the privilege of keeping his sword. To the crew of the *Sydney* it seemed the battle had created a bond of sorts between the opposing sides.

These events had an indelible effect on 16-year-old Arnold Mellor, who was serving as the Captain's signal boy on the Australian ship. Some years later, he was instrumental in establishing a Cadet Training Unit, which was to become a living memory to HMAS Sydney. The Unit blossomed at first, but after only seven years declined to a perilously low ebb. A close friend of Mellor, Leonard Forsyth, offered to take over. The new leadership had an immediate impact. The boys raised money - penny by penny - and numbers increased. By the following year - 1929 - a new headquarters for the Unit was built at Drummoyne and officially named "Sydney Training Depot".

Training boys in the art of seamanship, even on a voluntary basis , is an expensive undertaking, and by the middle of 1930 the training depot was facing a crisis. The rent and rates on the HQ at Drummoyne was becoming too costly and the group was advised to find alternative accommodation. About 200 metres off the shore of Drummoyne, between the Iron Cove Bridge and Cockatoo Island, was a rocky island of no more than a few hundred square metres, covered in lantana and infested by rats. The islet was known as "Snapper Island" - sometimes spelled as Schnapper Island, but had also been known as "Flea", "Mosquito", "Cat", or "Rat" Island. This gives one an insight into the environmental condition of the Island.

The Federal Government granted the Drummoyne Cadets the use of the Island in 1932, and work commenced on the building of a depot. 1000 tons of rock had to be blasted from the top of the island to create a level surface. Much of the rock was then used to build a sea wall around the island. In less than eight months 50 boys, most no older than 15, worked in their spare time to build a wall 90 m in length two and a half metres high and nearly two metres thick. Without financial assistance or outside help, the boys constructed a wharf, a guardroom and then reclaimed one thousand square metres of sea bed by building out to a concrete wall they had constructed on a reef. By the end of 1932 a signal station and other main buildings were erected and the island began to take shape and design of a proper training "ship".

In 1930 the HMAS *Sydney* was sold for scrap to Japan and in the following year was docked for the last time at Cockatoo Island for dismantling. Leonard Forsyth paid 30 pounds for the right to salvage whatever he could from the doomed ship and he and his cadets retrieved hundreds of items from cabin doors to cutlery. Thus began the Snapper Island Museum which, from modest beginnings, has developed into a first rate Naval Antiquarium.

The depot was officially opened on 26 November 1932 by Sir Charles Cox on behalf of the Minister of Defence, but it was not until 1937 that the Sydney Training Depot received full recognition as an independent Sea Cadet Unit. At the outbreak of World War 2 Snapper Island was voluntarily handed over the the Naval Authorities for use as a depot to accommodate Naval Guards, but the Island did not lose its individuality, however, as a number of boys and an officer were also taken over by the Navy to convey the guards to and from the Island. On 1 November 1942, Snapper was taken over by the US Forces as a seamanship school for its Ship and Guncrew No 1 Command. For the next 20 weeks soldiers were trained as seaman gunners for the American Merchant and small ships and later that year the island was used as a small craft engineering school for the AIF.

In 1944 the Maritime Royal Artillery Unit of the British forces requested permission to use part of the establishment as a billet and club. On 22 January, 1946 the island was returned to Forsyth's control.

Among the most valuable of the Museum's possessions is the first Blue Ensign ever flown on an Aussie warship and the first piece of artillery owned by the RAN. Among cannonballs and shells outside the museum building stands a ship's gun, cast in 1733.

The museum has four annexes all of which have been opened since 1975, the most recent one being the "Naval Sub Branch RSL" annexe which shows models and all types of small craft used by the RAN and the RN.

The Snapper Island Cadets are responsible for the upkeep of several boats including 3 whalers and a motor launch. They are taught naval flag signalling and are instructed in radio theory and morse code, which will lead, we hope, to several cadets joining the ranks of radio amateurs. It was with great pleasure that we saw Chief Petty Officer Mick pass his Novice Licence recently.

The New South Wales Chapter of the Royal Naval Amateur Radio Society operates from Snapper Island using the Club Station call VK2CC, every Saturday from 1000 EST till approximately 1700 EST on all bands including the WARC bands, CW on the even hours UTC and SSB on the odd hours UTC. It would only be fitting to issue an award called "The HMAS Sydney Award" which requires a contact with VK2CC plus four different NSW Chapter members or alternatively six NSW Chapter members. Further details will be gladly supplied by any RNARS NSW member. We are of course always on the look out for new members and invite any interested ex-RAN, ex-RN, ex-MN (of any nationality) and of course serving members of any of the above to join the RNARS.

ar

The R L Drake Company. 45 Years Young (1988)

BILL FROST WD8DFP (ORIGINALLY PUBLISHED IN THE DRAKE COMPANY PUBLICATION).
SUBMITTED WITH THE AUTHOR'S PERMISSION BY JOHN WEIR VK3ZRV PO BOX 469 ELTHAM 3095

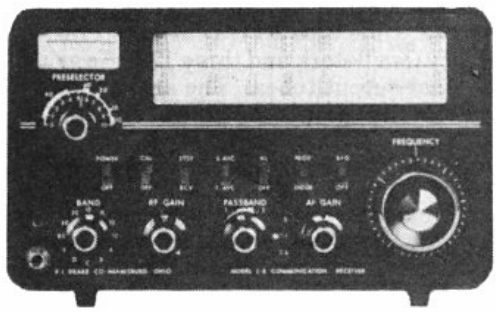
THE R L DRAKE Company was founded by Robert Lloyd Drake the eldest son of four children and also the father of four children. Born in Cincinnati, Ohio, he attended the University of Cincinnati after graduating from high school. At that time, the university was a city college and he lived at home while attending college.

Graduating in the early 30's, Mr Drake was first employed by Dayrad (Dayton Radio Co) in the Engineering department. He later went to work for Bendix Corp in their Aviation department. Mr Bill Lear, of Lear Jet fame, hired Mr Drake to work for his company, Learavia, in the Engineering department.

In 1943 Mr Drake decided to start his own company and leave his secure position at Learavia. He gathered three other people to help him design, and build his products. One of these individuals was Katherine "Katy" Quake, who is still a valued employee of the company. The company began at 11 Longworth Street in Dayton, Ohio. The upper level of the building was rented to a manufacturer of coat hangers.

The products at the time were low and high pass filters for amateur and military use. The filters for amateur use were a part of the company's product line for over forty years. A tank jamming device was also produced for the US military. The military also wanted a filter designed to eliminate the jamming, but this could not be done due to the method Mr Drake had designed. He had a difficult time convincing the government that it could not be done. The tank jamming equipment was successfully used in major events of WW2 such as Normandy Beach on June 6, 1944.

The recession that followed WW2 meant hard times for everyone, the R L Drake Co included. The company survived by continuing the production of filters and by doing small jobs for larger companies. This included making lamps for S S Kresge (of K-Mart fame) spring contacts for GE, coils and chokes for Delco, and communication cables for airplanes.



Courtesy R. L. Drake Co.

Drake Model 1-A receiver

Drake model 2-B receiver

Ten years later, in 1953, the company, now 10 or 12 employees, moved to Miamisburg in the once famous Baum Opera House, later to become the home of Star City Marine. If you stand in Market Square and catch the sun right you can still see Baum Opera House showing through the paint on the building.

The product line now included more accessories for amateur radio operators, such as Q-Multipliers for HRO and National receivers, product detectors for Collins Radio receivers, and the High Patch phone patch.

Being an amateur operator himself (W8CYE), Mr Drake had modified his own Hammarlund receiver for sideband reception. However he was not happy with the receiver's performance and knew he could design a "better mouse trap".

During a bad case of "hives", partially due to worry over the survival of the company and its employees, he began the design of the 1-A receiver at home. The receiver was long, thin and tall like a mailbox, but was destined to be the first receiver to be designed solely for single sideband reception. All other receivers for amateur use received only on AM or were old military AM receivers, which were then modified by the amateur for SSB reception.

Unsure that he could mass produce such a product, let alone finance it, he offered his design to well known receiver manufacturers such as National, Hammarlund, and Hallicrafters. After many letters back and forth and unable to reach a decision, the turning point came when "Gibby" of Universal Service in Columbus Ohio (a well known amateur radio supplier and friend of Mr Drake) said "You build'em and I'll take the first hundred". Hyde "Rube" Rubel of SREPCO, another Amateur Radio supplier, also supported the 1-A concept and urged production of the first single sideband receiver.

The first ten or so 1-A receivers were built at the old Baum Opera House, then in 1958 the company moved to the present 540 Richard Street address as more room was needed. The production of the 1-A was then put into full force. The 1-A design was based on a simple to operate concept, no bells, no whistles, easy to service, high quality, and high performance. Cosmetically, it was very plain, the front panel was black, the cabinet was black, and it was soon dubbed "The Black Box" among amateurs. Receivers prior to the 1-A were large, bulky, had large knobs, large meters, and were often called "Boat Anchors".

The 1-A receiver was a success, as it was well received by amateur radio operators. However, amateurs wanted a receiver that had both modes of reception, AM and SSB, built with the per-

formance of the 1-A. AM was still the most popular mode of communication among amateurs. Thus the 2-A receiver was designed and produced. It was soon followed by the design of 2-B receiver. Mr. Drake offered his 2-B design to radio receiver manufacturers such as Globe Radio and Hallicrafters, as he felt uneasy about increasing the size of the company. Unable to come to terms, it was decided in 1961, to proceed and build the 2-B under the R L Drake Co name.

In 1963, the company introduced its first transceiver and named it the TR-3. The TR-3 was a tube type unit, as were all Drake products at that time. It used a 9.0 MHz IF, tube type VFO (Variable Frequency Oscillator), and three 12JB6's as the final output tubes. The sensitivity was excellent and power output ran 300 watts PEP. The demand for the TR-3 was tremendous and its popularity grew as did the name Drake.

In 1965, the Inland Testing Laboratory (a division of Cook Electric, Chicago, Ill) was purchased by Mr Drake. The name was changed to Dayrad, a name familiar to Mr Drake as helping him get a start in his earlier years. Unfortunately, a few years later, the equipment was sold and the company dissolved, as there was not enough work to keep the employees busy. Some employees were transferred to the Miamisburg plant.

Then in 1966, a completely new line was designed and introduced, which became known around the world as the "Drake Twins". The receiver was the R-4 and the mating transmitter was the T4X. Also produced were accessories such as the W-4 wattmeter, the MN-4 matching network, the MS-4 speaker, and the AC-4 power supply. The R4-A soon replaced the R-4 receiver and the L-4 linear amplifier was introduced along with the MN-2000 matching network. The L-4 and the MN-2000 proved to be two of the most desired products by amateurs around the world. These two products are still sought after by amateurs today.

Shortly after the R4-A had reached the market, the company was approached by Radio New York Worldwide to build a low cost International Shortwave Broadcast Receiver for their own use. The SW-4 was designed primarily from the R4-A and was to receive AM only. The front panel stated "Designed especially for Radio New York Worldwide". Again, not wanting to expand beyond the company's means, the design was offered to RCA, who, at the time was a leader in communications type receivers. RCA was at the time producing the CRM-R6A receiver for the world communications market and declined the offer. The SW-4A short wave receiver soon followed the SW-4 with several improvements and with more solid state devices being used instead of tubes.

The C-4 station console was introduced in 1966 and was another first in amateur radio equipment. The unit was engineered and designed by Ronald E Wysong, who was later to succeed Peter W Drake as President and CEO of the R L Drake Co. The unit housed a phone patch, rotator control, wattmeter, equipment control switch, ID timer, 24 hour clock, remote antenna selector and it could also control power to other units in the "Ham Shack". Thus turning off the C-4 could turn all of the amateur's equipment off.

Also in the year 1966, Ron Wysong was interested in cameras and photography as a personal hobby. He learned that printed circuit boards involved photography and negatives. He persuaded the company to invest in the first steps towards a printed circuit department. He made an etching table out of plywood and 2X4's, mounted a motor to vibrate the table top, and was soon making progress. The first printed circuit board to be used in a product was the audio board of the R4-B receiver. This was the start of the PC Fabrication Department.

In the year 1967, the 2-C receiver and the 2NT CW transmitter were introduced which filled the need of a good low cost novice station for many beginning amateurs. The TR-4 transceiver replaced the TR-3 with several improvements, including a solid state VFO, and a BFO circuit.

The R4-B, T4XB and the L4B were improved versions of earlier products and were introduced in late 1967. The production rate was averaging four to six units per day of most products. More room was needed and an addition was made to the building to provide office space, an Engineering Department and a lunch room area. The Engineering Department was sharing space with the Machine Shop in a small building across the railroad tracks from the main plant, and so the additions gave the entire building to the Machine Shop.

The SPR-4 was introduced in 1970 as a replacement for the ever-popular SW-4A. The receiver was all solid state, could receive both SSB and AM and crystals could be added to extend the listening range to meet the needs of the owner. The two metre FM (frequency modulation) band was gaining in popularity and the ML-2 two metre FM transceiver was introduced. This was the first unit to be imported and sold bearing the R L Drake Co name. This led to the import of the TR22 portable transceiver and the TR22M transceiver. The TR22M was a marine FM transceiver which allowed the company to enter the marine communications market. The introduction of the TRM single sideband transceiver followed and its use ranged from small shrimp boats to the large oil tankers. The TR22C was imported to replace the TR22, which was later replaced by the TR33C. All three units required crystals for each channel, unlike the synthesized hand-held units of today.

The DSR-1 receiver was introduced in late 1971. It covered the complete HF spectrum and used 'nixie' tubes for the digital display. It also allowed reception of independent sideband as well as single sideband and AM. It was followed by the MSR-1, a 19 inch rack-mount commercial type receiver. The MSR-1 was used aboard ocean-going ships as the main receiver. The DSR-2, MSR-2, and the MSR-FMP succeeded the DSR-1 and MSR-1. These units contained gold plated switch contacts to minimize contact failure in the salty air.

The ever popular C-Line was introduced in 1973 to replace the B-Line Twins. The C-Line units made use of more solid state components, a dual dial VFO, a plug-in antenna change over relay in the T4XC, and crystal filters replaced the old reliable PBT (passband tuner) in the R4-C. The R4-C receiver and the T4XC transmitter are still sought after by many amateurs and held as prize possessions by others. Accessories included the TC-2 two metre transverter and the SC-2 receiving converter, the TC-6 six metre transverter and SC-6 receiving converter as well as the TR-6 six metre transceiver.

The SSR-1 receiver was imported and added to the shortwave receiver line as a low cost unit covering the complete spectrum from broadcast band to 30MHz. A whip antenna and a compartment for eight "D-Cell" dry batteries made it portable.

In 1975 amateur radio operators across the world were in deep mourning as word spread that R L Drake Sen had passed away. They had lost a very dear friend, a fellow amateur, and a pioneer of a amateur radio. The operation and management of the company was turned over to Peter W Drake, as Mr Drake had been training his son to assume his position for some time.

Drake amateur radio equipment can be found in every part of the globe. If the equipment is not there, the name Drake is known and respected. Amateur radio operators come in all walks of life and at one time or another have owned, wanted, or used a piece of radio gear made in Miamisburg, Ohio. King Hussein of Jordon has used Drake gear, as well as Barry Goldwater, Roy Neal and Ronnie Milsap.

The amateur radio station aboard the "Queen Mary" was once a complete line of Drake equipment. The R L Drake Co radio equipment has been used in hot air balloon flights trying to fly non-stop across the country or around the world. An around the world attempt on a sailing yacht used Drake gear, the details of which were outlined in an issue of the Smithsonian Magazine. The non-stop flight of the Voyager space craft was aided with Drake gear. Many far away and remote islands have been temporary home of DX-peditions using Drake gear to contact their fellow amateurs. A complete 7-line system was taken to China as international goodwill by a Californian University. Famous amateurs who were Drake users include James Stewart, Chet Atkins, Joe Walsh and astronauts Owen Garriot and Tony England. Marlon Brando, at one time, wanted to use Drake amateur radio equipment as a communications link on his island.

In the year 1977, land was purchased in Franklin Ohio, just off Route 123, to build a new production facility. The production facility was to be completed in three phases. The first phase of the building provided 42,500 square feet and was completed in 1978. The Machine shop, PC fabrication department, production lines, and component assembly lines were moved to this new facility. The office staff, Sales department, Engineering department, and the Service department remained at the Miamisburg plant.

Production now included the TR-7, a completely solid state transceiver and a companion receiver, the R-7. Complementary accessories included the L-7 linear amplifier, WH-7 wattmeter, and the MN-2700 matching network, to mention a few. The UV-3 was introduced in 1978, and was another first in amateur radio. It was a single unit housing a 146 MHz band, 220 MHz band and a 450 MHz band FM transceiver all in a compact, rugged package. It was designed for mobile or base station use. The MRT-55, designed from the UV-3, proved to be a viable product in the marine market, and led to the production of the MRT-55. The RR-3 was introduced in 1981 to replace the RR-2 which had replaced the RR-1 earlier. The RR-1 had gained popularity as being a very reliable, low cost secondary receiver aboard ocean going ships.

The TR-4310 transceiver and the R-4245 receiver were also introduced as primary units for ocean going ships. These were redesigned TR-7 and R-7 respectively with a VRTO (variable rate tuning oscillator), full transmit coverage, and with all crystal filters installed. They were also standard 19 inch rack mount units built for rugged duty. Radio Monaco at one time used four complete rack mounted stations, consisting of the TR-4310, R4245, L-77 and MN-4438. The L-77 and the MN-4438 were built on the lines of the L-7 and the MN-2700 with a face lift to match the TR-4310 and R-4245.

In the year 1981, it was decided to enter the home satellite receiver market. This meant a completely new product, which means engineering time, drawings, PCB layouts, ordering parts, market analysis, marketing forecasts and advertising brochures, all of which take time. It is usually two years or more before all of the pieces fit together and a product is actually on the shipping dock. The ESR-24 design and production set new standards, as it was in shipping within eight months. Design of the ESR-24 began in May, the first prototype unit was shown at the Omaha, Nebraska home satellite show in August, and the first units were shipped in November of 1981. The ESR-24 was the first cosmetically appealing, professionally built consumer receiver. The competition units were either built in a back room or a garage. It was designed especially for the home dish owner. It soon became a leader in a very new and exciting market.

The ESR-24 brought new fame to the company, so instead of offering the design to other manufacturers, the company was actually approached by other manufacturers to produce receivers under their name. The OEM accounts included, Channel Master, Winegard, Connifer and National Microtech. In July of 1983, the upper level of a building in Springboro Pike was leased to the company. The office staff, Sales staff and Engineering Department were moved to this new address to become the Corporate Office. This provided the much needed room for all departments, which were expanding rapidly. The second phase of the Franklin plant became a reality in 1984. An addition of 50,000 square feet was added, which gave an overall building size of 92,500 square feet. This addition provided the much needed room to move the Engineering department into the same building with the Production department as well as providing more area for production lines. The PCB Fabrication department now occupied 11,000 square feet of the building. Its waste water treatment plant could treat 80 gallons a minute, removing all heavy metals, and automatically adjust the pH balance properly before being released.

The postponed, but eventual decision was made to cease production of amateur radio equipment, as the market had all but disappeared, there was a lack of FCC deregulation, the foreign competition was increasing more and more and the dollar was strong. The home satellite receiver market was also a very young, but promising market which required the company's full attention.

The ESR-240 receiver replaced the ESR-24 in November of 1983. The receiver was much like the ESR-24, but it had infrared remote control, a built in polarity circuit to control the polarotor and other improvements. The ESR-224 receiver was introduced as a low end receiver and was replaced with the ESR-324 in January of 2984. The ESR-24 remains as the most popular low end receiver to date for the company. The ESR-240A followed the ESR-240 in October of 1984 and was produced until April 1985.

A 10 foot non-mesh dish was designed and packaged as UPS shippable. The dish was also packaged with the ESR-324 receiver and APS-24 positioner and marketed by a Curtis-Mathis Home Entertainment Centre. The APS-24 antenna positioner was designed as a companion to the satellite receivers and was well accepted by the market. It was replaced by the APS-24A in March 1984 which was produced until November 1986 when it was replaced by the APS-24B. The APS-24B is currently in production. The ESR-2220 was produced for commercial installations such as small cable companies. Its design was based on the ESR-24 with changes making it suitable for commercial applications. It, like all commercial units, is supplied in a 19 inch rack cabinet for easy mounting. The ESR-2240 receiver and the VM-2410 video modulator were produced in March 1984 for the commercial market replacing the ESR-2220. The ESR-1240 is a redesign of the ESR-324 block receiver for 19 inch rack mounting. Both the ESR-2240 and ESR-1240 receivers together with the VM-2410 video modulator are current production units.

The year 1985 was a very exciting year for the company. In November, INC magazine recognized the R L Drake Co as one of the fastest growing private companies of the country. The country was ranked 380 out of 500 companies. The ESR-424 receiver and the APS-424 antenna positioner were also introduced in 1985. The receiver was available in two models, single conversion and block. Both units were microprocessor based, which was a new design concept for the Engineering department. These were also used in the Black Widow System, which was a complete satellite system including the dish, cables, etc.

To be Continued

The Story of Stephen Frith

PART 2

H KARL SAVILLE, VK5AHK 1290 NORTH EAST ROAD, TEA TREE GULLY 5091.

Introduction

IN PART 1 OF THE STEVEN Frith Story I thought the use of the Morse code for the disabled would be of interest to radio amateurs in general. I would now like to develop the Stephen Frith Story and spell out in more detail, and in chronological order, the work as it was carried out. My hope is that it will encourage and help other amateurs who may want to do this sort of work for the disabled.

I must at this stage point out that Steven has since told me that his name is Stephen — not Steven — so I must in future be more careful and use his right name.

Stephen was admitted to the Regency Park Home for Crippled Children when he was one year old. As mentioned in Part 1, he was completely helpless, unable to use his arms or legs, and unable to talk.

While at the Regency Park Home he was taught to read, but was not taught to spell. When he was about five years old, Linda, his future wife, arrived at the Regency Park Home. Linda had a difficult birth which left her completely helpless but she can talk, although with some difficulty, and she went further in her education than Stephen. They were brought up together and they have developed a special kind of body language, which is quite uncanny at times.

Stephen was about 17 when he was transferred to the Home for Incurables in Fisher Street, Adelaide. This name was later changed to the Julia Farr Centre. Linda arrived at the Julia Farr centre some time later, and through the good services of my friend Morry, and urged on by Linda, she and Stephen were married in 1988. It was a great occasion, and the wedding service was held in the Julia Farr chapel. I should mention that Morry, and it is his wish that I do not give his surname, spends all his spare time helping the disabled.

It was Morry who asked me to help Stephen. I had retired from working at Woomera in 1973 and, having been in electronics all my working life, I surrounded myself with all the latest electronic gadgetry, took up amateur radio, computer programming, video etc, and was having a good time in my retirement. Then, about three years ago, I began to have feelings of guilt. I was very healthy, had a wonderful wife and family, grandchildren and great-grandchildren, and yet I felt something was missing; I ought to be giving instead of taking. I knew my brain was still functioning as it had when I was in the workforce, but I was too old to get a job. Surely there was someone out there whom I could help instead of just amusing myself day in and day out. I thought of Meals on Wheels as a way out of my dilemma. Then, up popped Morry. I didn't know him then.

He had been speaking to my wife and it was she who had told him I was interested in computers, and so he appeared on our doorstep and asked if I would help his friend.

The problem was explained to me and it was just the very thing I was looking for. I could use my knowledge to actually help someone. There must be thousands of people like me, healthy, retired and with plenty of experience and knowledge that just cannot be tapped because we are too old.

Meeting Stephen

A date was arranged and off we went to see Steve, as I knew him then. As we went into the room on the seventh floor of the Julia Farr Centre building, the male ward nurse came over to Morry to find out why we had come along and, when he knew what I was proposing to do he said, "You are wasting your time. Steve has been assessed by professionals as incurable."

I met Stephen's mother, Lois, and I told her what I was trying to do and she was very sceptical. She had heard it all before.

Problems

The first thing I did was to find out whether Stephen could operate a switch, and how. He could not control his arms, hands, or feet, but I thought he might be able to operate a switch with his chin.

I suppose, because I was a radio amateur, it was logical that I would use the Morse code as a means of communication for Stephen, and for the following three weeks I attempted to teach Stephen the Morse code, with a buzzer and chin switch. We would spend at least two hours a day and it was during the very hot weather in January 1989. At the end of each two hour session Stephen would be in a real sweat, but he worked very hard and by the end of the three weeks had memorized the 26 letters and 10 numbers. I had set up a large card, on the wall with the character codes on it, so that he could study and memorize them, and for his training sessions I would write on a card, in large letters, a four or five letter word and underneath each letter the corresponding Morse code symbol. In this way Stephen would know what the code was for each letter, but he was very slow at the beginning as he had very poor control of his neck muscles but he got better as the days wore on.

Initially his timing was very bad and he could hardly differentiate between a dot and a dash, but I found that if I counted for him, while he was operating the switch, he was able to give a reasonable sounding dot and dash sound. I would say "Press, Off" for a dot and "Press, one two three Off" for a dash. This helps him a lot and I can only assume that because Stephen had never spoken and not lived in the so called real world he had not developed a time sense. I know myself I used to develop photographic negatives and I became quite good at counting seconds. I find myself counting seconds at all odd times, and like most people I can judge how long it is going to take me to do a certain job. Stephen has had no need to develop a timing sense and so he would find it very had to produce the dot, dash, and interval timing requirements of the Morse code. He also suffers from muscular spasms and at anytime he can get locked into a position where, he is unable to press the switch, or he cannot release it.

Introduction to a Computer

After about a month I felt that Stephen was ready to go on to a computer. I had been busy programming a Microbee computer with a program which I thought would be suitable for him.

It used a moving cursor, (8), which moved from the bottom left of the screen to the right. Above the moving cursor were several commands equally spaced across the screen:

DOT PRINT DASH DELETE MENU

As the cursor comes under each command it pauses for 3 seconds, and then moves on to the next command. In this way Stephen can select any command by pressing the switch during the pause period. If the DOT command is selected, the word DOT is printed on the line above the commands. The cursor returns to the left hand side and starts to move across again. Further DOT or DASH words appear as they are selected. Each time a selection is made the cursor returns to the left hand side to repeat the scan. Finally, when all the dot and dash code elements for a particular letter, has been assembled, the PRINT command is selected and a decoding routine in the computer prints out the appropriate character, in extra large letters. It can be a very slow process for a severely disabled person to print out a message onto the screen but a slow system must be better than no system, and it was not long before Stephen printed out onto the screen, the word "MARIA". I looked at him and jokingly said surely you haven't got another girlfriend, and Linda, his wife, said. "Maria is my second name". This was a very dramatic and emotional experience. It was the very first time that Stephen had been able to tell somebody something that they did not know. I hadn't known what Linda's second name was, and here was Stephen, whom the professionals had assessed as incurable, telling me that his wife's second name was Maria. Linda said "I see it but I do not believe it".

Stephen needs about 3 seconds pause at the commands when selecting the letters, but it is very easy, computer wise, to speed up or slow down the action as desired.

Phrases

Communication speed can be greatly increased by using phrases instead of building up a sentence letter by letter. Phrases, such as "I want a drink" etc. can be stored in the computer's memory, and can be displayed as quick as selecting a single letter. Where it may take about 30 seconds to display a single letter, a phrase of several words can be displayed in the same time. Up to about 100 phrases can easily be stored in the computer. These are displayed in lists of six phrases and any one can be accessed by selecting a single letter. The letters with the minimum Morse elements are used to save time. A sample list of phrases would look like:

E. change list
T. I WANT A DRINK
A. I AM HUNGRY
I. IT IS COLD IN HERE
N. I AM UNFOMFORTABLE
M. SWITCH THE RADIO OFF
D. TURN THE VOLUME DOWN
S. Back to the menu.

If, for example, the phrase "IT IS COLD IN HERE" is chosen, this could be displayed in large letters by selecting two DOTS, and then then the command PRINT. The list can be changed by selecting one DOT and then PRINT. Each new list is preceded by the same letters: ETAINMDS

Used in conjunction with a word dictionary, individual words or names can be added to any phrase as required. One such phrase can be:

I HAVE A PAIN IN MY

to which can be added, from the word dictionary, say, ARM etc.

Considerations

Giving a computer to a person who has never spoken before can be very exciting but when you consider that that person may be left for long periods day after day, a word processor program, on its own, could become very boring. It is therefore necessary to provide some stimulation in the form of computer games. And it is here that you see the disabled really enjoy themselves. Having watched other people playing games, on the television, etc it becomes very exciting indeed for them to be able to participate in some game of skill.

Unfortunately I have not found a source of computer games for the severely disabled and I have had to invent games or program known games into the computer myself.

There are many skill games that can be adapted for use in a computer. Tic Tac Toe or Noughts and Crosses, Pacman, Snakes and Ladders, Guess the Number game where the computer 'thinks' of a number and you have to guess what that number is. Stephen has these plus an electric wheelchair simulator, a helicopter shootout game, a drawing program, and a four function calculator.

Programming requirements

When programming for the disabled great care must be taken to ensure that it is simple to use. It must be bug proof. It must be autostarting, as soon as the power is switched on. The operator must be able to get from one program to another. They cannot depend on the nursing staff to change programs, or recover a crashed program.

They are on their own and the programmer must realise this and program accordingly. The disabled person will be spending long hours on his own and so the computer and programming must be reliable.

Fortunately I have found the 32K ROM-based Microbee to be ideal for this work and because most people want disc computers these days the old Microbee can be bought reasonably cheap on the second hand market.

ar

Radio Volunteers Help Severely Disabled People

GEORGE WINSTON AM BE TAD EXECUTIVE ENGINEER

BERYL IS THE WIFE OF A sheep farmer in the Central West of New South Wales. She is a quadriplegic and spends a great deal of time alone while husband John is out in the paddocks on his motorbike mustering and fence mending. Beryl has, on occasion, had to cope with emergencies such as falling out of her wheelchair. Then she just had to wait until John's return as there was no way for her to contact him.

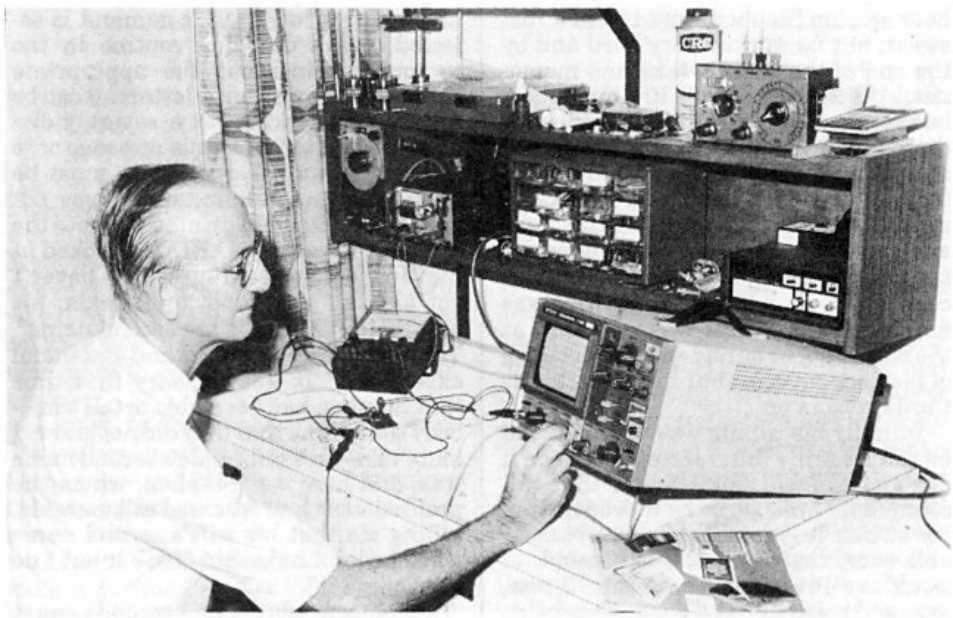
Enter an extraordinary group of helpers called Technical Aid to the Disabled (TAD). Comprising tradesmen, engineers and technicians of every description. TAD numbers 300 volunteers in NSW. In Beryl's case, Robert, a senior Telecom engineer, accepted the challenge of giving Beryl a communication channel with her husband.

Robert chose CB radio as the best medium. Because Beryl could not carry a CB transmitter on her wheelchair, a link was required and Robert added to the transmitter a tuned circuit which responds to a whistle. He also modified the output to emit a coded signal to prevent interference from other CB signals.

Beryl wears the whistle on a cord around her neck and blows it whenever she needs to call John home.

John's CB receiver is usually mounted on John's motorcycle or tractor. It is modified to receive only the coded signal emitted by Beryl's transmitter and is fitted with a relay and a hooter powerful enough to be heard above the noise of the engine. John cannot speak to Beryl but when he hears the hooter he knows that she needs help. The receiver has had to be reinforced to prevent physical damage from falls and bumps and has been repaired several times by TAD volunteers. John can now work in the paddocks all day, confident that his wife can contact him in case of trouble.

In NSW, TAD volunteers help over a thousand people with disabilities every year when equipment is needed and no commercial item can be found to do the job. Engineers, technicians and tradesmen can be TAD volunteers. Access to a suitable workshop is essential. Cost of materials is reimbursed to the volunteer.



Alan Every, an electronics engineer, uses his skills to devise one-off equipment for people with disabilities.

Volunteers have the satisfaction of knowing they have helped others and of exercising their technical ingenuity. Further volunteers are always welcome.

TAD branches operate in nine NSW regional centres, in the ACT and sister organisations exist in every state except for the Northern Territory. TAD can be contacted on (02) 808 2022 or by mail at PO Box 108, Ryde NSW 2112. **ar**

Commonwealth Contest

It appears that the HF Contests Committee of the RSGB are having difficulty in getting both the rules of the 1992 Contest and the results of the 1991 one into their own magazine because of space restraints by the Editor of Rad Com.

For the last 30 or so years, BERU has been held on the second full week-end in March, and in 1992 will be from 1200Z on Saturday 14 March to 1200Z on Sunday 15 March.

The JA contest mentioned in December AR will again clash with, and make things difficult for Commonwealth contacts. Representations for a change in the date of this contest have been made to the magazine which sponsors it, direct and through IARU but with no result.

An appeal is made to all VK's for a maximum effort to ensure that this 61 year old contest BERU does not disappear under the weight of Japanese pile-ups on the rest of the world.

Rules will appear in February AR, and 1991 results as soon as received.

Add to Contest Calendar

March 14-15 Commonwealth Contest

ar

My First Ship

BOB CLIFTON, VK5QJ
4 WEST TERRACE, BEAUMONT 5066

IN THE EARLY WAR YEARS at the age of 19 I left Adelaide to join the Marconi Radio School in Melbourne with Ray Bennet (VK5RM) and settled in under the principal, Cec Bardwell (VK2IR).

Like Ray, I had been involved in the Army call up earlier, but had been given the green light to attend the course to become a Ship's Radio Officer, with the proviso that should I fail one of the exams I would be back quick smart into Khaki. With that sort of encouragement success was never in doubt!

After getting my Second Class Certificate, I was all ready for the big adventure, "but not so" said Cec "You are not going anywhere until you get your First' so back to the drawing board for another three months.

Eventually I was told to report in to Geelong to join a Norwegian Tanker the *'Ora'* as second RO. It was with some trepidation that I approached the oil terminal, and not a little awe are I took a long look at my first ship.

She was big for those days, about 16,000 tons and quite new, built in 1938 with a crew of about 30 Norwegians and Danes.

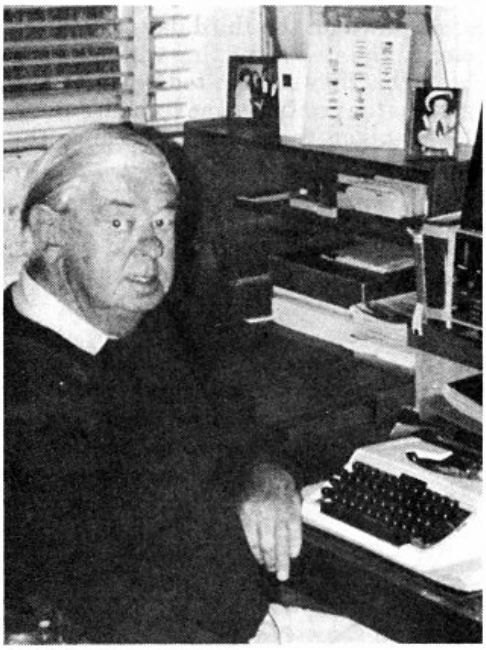
I wondered what I had got myself into, just a kid, no sea experience, no languages, and had never seen the inside of a ships radio station.

I went up the gangway clutching my meagre belongings, and after negotiating myriads of pipes and pumps on the tank deck found myself face to face with a burly three striper, who turned out to be the Chief Officer.

He spoke good English and took me up to my cabin located below the bridge, which was quite luxurious, having been occupied in peacetime by the owner from time to time.

Later in the afternoon I met the Captain and the Chief RO who was about 40 and had my first introduction to the Radio Room located off the Chart Room.

The gear was modern and very impressive consisting of Norwegian Marconi medium and short wave transmitters of 1kW and two receivers, the main being



VK5QJ in the Shack

an RCA AR88 LF Tuning from 73 kHz through to 30.500 MHz, plus Echo sounder, DF and Auto Alarm. In addition we had emergency battery power from a bank of batteries located on monkey island and two lifeboat portable transmitters kept in the Radio Room.

As we had only two ROs the watches were torrid and tiring with six on and six off, particularly in the Persian Gulf where we sweated in 130 degree heat in a box surrounded by concrete blocks ostensibly to offer some protection from shrapnel.

Watchkeeping was for the most part pretty boring, with listening on 500 kHz for distress traffic, taking time signals for the bridge, believe it or not from Germany on HF, and monitoring broadcasts for Allied Merchant Shipping at fixed times for messages to individual ships, which we had to acknowledge on HF as quickly as possible, and only at night, to avoid enemy HF direction finders on submarines or surface raiders.

The only other times the transmitters were used was when the ship was passing from one grid sector to another so that the Admiralty knew at all times our approximate location.

We sailed to Melbourne and Sydney where the remaining petrol was discharged and the tanks opened up to degas the fumes. Always a dicey operation with no smoking anywhere on the ship or in the vicinity.

Being a new chum I was constantly cornered by off duty officers who wandered into the radio room for "English lessons" as they wanted to improve their vocabulary so they could chat up the "nice girls" in Sydney... their favourite port! I suggested they could get some lessons from the English DEMS Gunners berthed aft, but they complained they couldn't understand the Pommie accents.

Prior to sailing from Sydney I asked the Second Mate where were we going. He told me to keep my eyes open, but if we started loading wheat in sacks into the forepeak we were off to the bloody Persian Gulf...If no wheat it would be San Diego or San Pedro in the States.

Forty eight hours later we sailed with the wheat direct to Abadan.

The trip was uneventful, no other ships were sighted, but the Japanese subs were prowling the Indian Ocean and the Gulf entrance and we picked up a number of calls from ships attacked in the Bay of Bengal and off Colombo. There was nothing we could do but to log the call and hope the coast stations had picked it up.

The "Old Man" was a very tough old Viking and scared the hell out of everybody. Even though the deck space was very limited he insisted that one whole deck on the port side was *verboten* to any of the officers, and reserved for his sole use. My cabin porthole looked out on this hallowed ground and I would see him pacing for hours puffing on a Chesterfield.

As Norway was under complete control by the Nazis he had no contact with the owners and was God! I remember on one occasion our entire stock of American cigarettes, purchased in the States the previous trip, was flogged in Bombay and substituted for hundreds of cartons of

Suez cigarettes. A few of us gave up smoking at that time!

We carried about 6 million gallons of high octane gasoline either loaded in Abadan or Bahrein and made several trips to Bombay, the Middle East ports and Massawa in the Red Sea. We were one of the ships in Massawa after the Italian capitulation and the port was a graveyard of bombed out wharves and sunken ships littering the harbour. The city however seemed to have escaped the worst and the restaurants and the Lido served up magnificent food, in addition to offering fabulous swimming in the pool and hot baths...a real taste of Roman indulgence. It was like escaping from a concentration camp for a few hours at least.

Although the dining saloon amidships would comfortably seat all of the officers, only the Chief Officer and Chief Engineer were allowed in this Holy of Holies. We lesser beings were seconded to a mess above the engine room aft where a Chinese cook, who wouldn't have lasted five minutes in a Kings Cross hash house, dished up a mess of fish soup, scouse, and fiery curry all laced with, caraway seeds for virtually every meal. I would have given a month's pay (little as it was) for some ham and eggs or roast beef and pud, but things were to change.

Tension started to build up always after loading in the Gulf, because with the tanks topped and low in the water, we would head towards Banda Abbas, the narrowest passage leading into the Gulf of Oman. A Royal Navy old liner, converted to a communications centre was permanently anchored there; its function being to arrange convoys (if you were lucky) and provide up to the minute (hopefully) news of enemy activity outside the Gulf.

The submarines would sneakily let the empty tankers through, and wait for the loaded ones to come out so it was a bit of Russian Roulette who was going to cop it, especially if you were heading for Australia because most of the convoys were formed for ships heading for the middle east.

After about a year between India and Suez we loaded for Melbourne, leaving the sea snakes and bum boats which are prolific in the Gulf and hoped to make it home in one piece. Incidentally, one could buy a Persian Carpet to cover a lounge floor for a carton of American cigarettes from these boats. They wouldn't give me a door mat for a crate of Suez!

We cleared Banda Abbas in good weather, passed through the Arabian Sea into the Indian Ocean, well south of Colombo when on the night watch I took down and decoded a long message from the NOIC in Ceylon. It appeared that Ceylon had not had radio contact with a ship called the *Fort Buckingham* for some time, en route to South Africa from Madras, and assumed she had been lost to enemy action in an area we were due to pass through in three days. We were ordered to make a search for the survivors.

In the meantime Catalinas presumably from Colombo were seen in the area making sweeps whilst we had lookouts constantly on monkey island hoping for a sighting.

At dawn on the third day a Catalina circled the ship signalling with an Aldis lamp that they had spotted two rafts, and gave us the position some six hours away. I had taken the message because the Chief RO was lacking in English.

We found the rafts containing about 15 Lascars and 4 white officers which had been followed by a group of about ten large sharks which came alongside the "Ora". I estimated them to be at least 18 feet long. The second mate shot at them with a 303 to clear them away whilst we helped the men up a Jacob's ladder.

Whilst they appeared to be in reasonable shape, five of the Lascars died on board from exposure within a few hours, after 16 days on rafts.

The officers were bedded down in various cabins and out came the goodies kept by the "Old Man" from the "First Class Saloon". Tinned fruit, ham, eggs, American cookies, soups and even ice-cream.

We hadn't seen the like of it for 12 months, and I appreciated the comments of one of the rescued apprentices who said we lived like kings and he was going to sign up on a Scandinavian next time!

The sequel to this saga was, we transferred the survivors to a RN destroyer a few days later and then proceeded to Sydney where I signed off, even though she was off to the States on the next trip.

Forty seven years later I was curious about the officers we had rescued, and so I wrote to the "Seabreezes" magazine in England asking that they make mention in their Contact Wanted section that any survivors of the *Fort Buckingham* might like to get in touch with me as I was on the ship that rescued them so long ago after being torpedoed.

To my surprise I received a letter from a relation of the Captain of the *Fort*, stating the the master was a Captain Murdo MacLeod DSC from The Isle of Lewis, Western Isles Scotland. He was lost when the ship went down in six minutes. He was aged 60.

He had a most distinguished record being Commodore of the PQ18 Convoy to Russia in 1942 in which they suffered huge losses in ships in atrocious weather but accounted for over 20 German planes and two submarines.

It seems ironic that after surviving the hazards of the North Atlantic and Russian Convoys throughout the War, he was to perish in the warm waters of the Indian Ocean in 1944. Three Radio Officers were also lost.

I finished my seagoing career on many ships of the Union Steamship Coy, and finally swallowed the anchor after a brief stint on ships of the Blue Star Line in 1950, carrying refrigerated produce and about 15 passengers to the UK in the *Brisbane Star*, and bringing back hundreds of British migrants to Australia on the *Empire Star*. Now I'm quite happy pounding brass on 20 metres.

ar

The Norwegian tanker Ora – *Bob's first ship.*

Garnish DX Club
A Piece of "The Rock"

BILL WILSON VO1TX PO BOX 36 GARNISH, NFLD, CANADA
(SUBMITTED BY RON CHURCHER VK7RN)

THE GARNISH DX Club is offering exclusive to those Amateurs world-wide who have worked the club call VO1GDX or VO1TX, (Club call custodian) ex V06TX, VE3OZT/VO1, an opportnity to purchase a piece of "The Rock", as Newfoundland is often called by native Newfoundlanders and others!

Imagine the envy of your friends, when you boast about the vacation "spot" you own in picturesque Garnish, situated on the shore of Fortune Bay! Filled with Lobster, Cod and other species of sea life, the bay also offers spectacular sun-sets.

Within walking distance flows the lovely Garnish River, where fantastic fly-fishing for mighty Atlantic Salmon, Brown and Rainbow Trout are available to the ardent fishermen. Number "ponds" or lakes as they are called "Down South", provide excellent Sport Fishing in both winter and summer.

Just minutes away from your "Spot" , by ATV (All Terrain Vehicle, not Amateur TV) hunt for Moose, Black Bear or Rabbits, with gun or camera, truly an outdoorsmans Paradise! Slightly further afield there are herds of majestic Caribou roaming the barrens.

Excellent DX location, work the world from right here in Garnish or travel a few miles to FPland, St Pierre, delightful French Islands just a short boat ride from Garnish. Or maybe a journey to VO2Land Labrador (Zone 2) awaits the avid DXer. Even Marconi recognized the DX advantage, "The Rock" offers. After all he originated DXing with his First Ever DXpedition back in 1901 from Signal Hill!

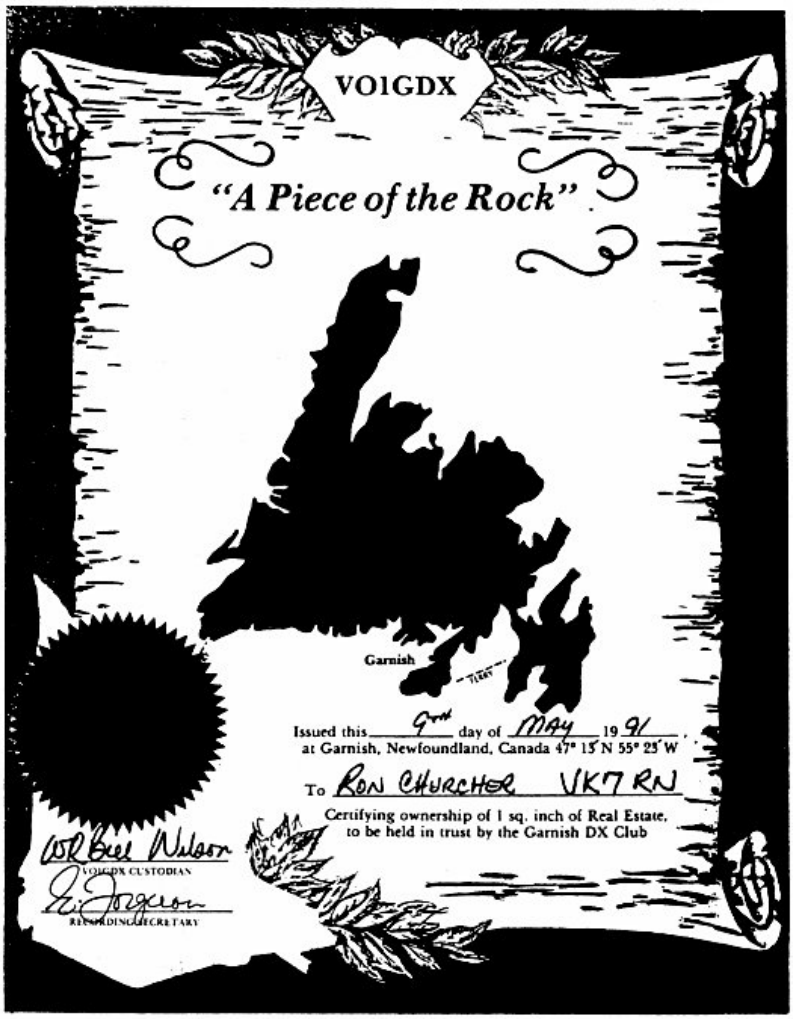
You would expect to pay a bundle for all the preceding. Not So! Your very own Vacation "Spot" can be yours now for the Unbelievably Low Price of only $ 10.00 US or $12.00 Canadian! No the computer is not out of Whack! $10.00 US or $ 12.00 Canadian!

You will receive the following:

- Full Colour 8 1/2 x 11" Certificate or Deed (to one square inch of Real Estate held in trust by VO1TX and the club. This attractive certificate is suitable for framing.
- Full Colour 5 X 7" Photo View of Garnish
- Membership in the Garnish DX Club, wallet sized ID. Please include 15 IRCs, or Money Order, or Cash payable to WR Wilson, in appropriate amount with your order and mail to The Garnish DX Club PO Box 36, Garnish Nfld, Canada A0E 1TO. Please allow 6 - 8 weeks for delivery. All Postage and Handling charges are included in the price.

Proceeds from this sale will further Club projects such as DXpeditions to FPland, VO2land and the Club Repeater and Satellite systems. We invite your participation.

ar



Remembrance Day Contest Healesville Amateur Radio Group

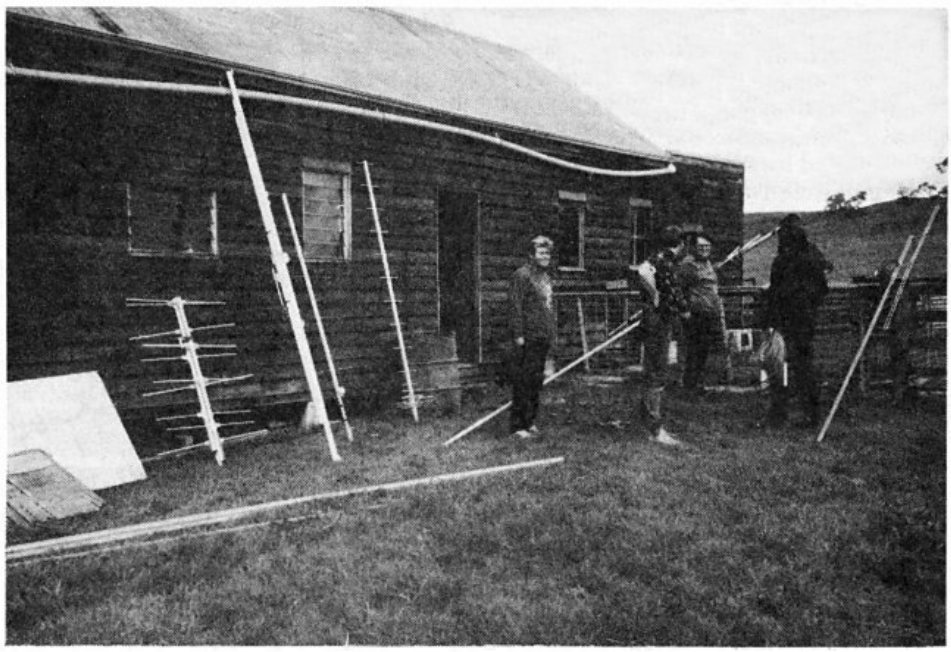
DEREK THURGOOD VK3DD
PO BOX 234 YARRA GLEN 3755

HEALESVILLE AMATEUR Radio Group is a relatively small club (approx 40 members) and only about 4 years young. As a young club we see contests as an ideal way to involve new and younger members, some of whom are still studying for their licence, in the various aspects of operating radios under various conditions.

Some contests are conducted from the Club rooms in the centre of Healesville and others are operated from a field location. The RD contest is one that we have decided should be operated from a field location. However bearing in mind the time of year and likely weather patterns we took the soft option and set up for 1991 in a shearing shed on a farm at Acheron some 70km North of Healesville just outside Alexandra.

Setting up commenced on 3rd August when a group of members, Derek (VK3DD) Graeme (VK3GPT) Lynn (VK3DKE) Gavin (VK3TLN) Telford (VK3TWJ) and Telford's XYL Dot visited the property in question to assess the lay of the land for antenna set up and to start cleaning the shearing shed to ensure that there was room for those who attend on the weekend of the contests to have somewhere to put their heads down (if required).

Murphys Law states that "if something can go wrong it will' and we decided to get rid of Mr Murphy early. Those of us who travelled up to Alexandra from Healesville on 3rd of August arrived at the appointed meeting place to find....nothing! The local club member had thought that we knew where the property was and was waiting patiently for us there. With the usual cool aplomb of Amateurs we cleverly called him on the local repeater and the usual club simplex frequency but...Murphy again! he had his rig on but was nowhere near it. Anyway, after a short drive in to Alexandra Graeme found out where we were supposed to be, and after losing only 40 minutes or so we were busily inspecting the shearing shed and doing a bit of housework.



Hardworking HARG members in deep thought about antenna location

Much discussion and sorting of equipment saw a keen bunch of HARG members heading for Acheron on the contest weekend.

We departed the clubrooms at Healesville at about 0930 (local) on the Saturday and travelled in cool, cloudy conditions to Acheron. The weather cleared somewhat when we crossed the ranges and a fine outlook seemed assured.

On arrival at the property vehicles were unloaded and gear sorted out. The first task was laying out the various antennas (12 in all!) However, when the time came to run the coax someone (notice I didn't use any names Grae....!) sheepishly indicated that the cables and connectors were stored very safely in a equipment cupboard back at the club (luckily we were only about an hour away from there!)

Finally we had antennas up and rigs on - we had in fact set up two stations - one for HF and another for VHF/UHF - VK3GH & VK3GHA respectively.

Antennas in the air above the shearing shed were:- 80m inverted vee 20m inverted vee, 40m dipole, delta loops for 10,15 & 20m, 6m beam and vertical, 2m beams (2) and vertical and a 70 cm beam – quite a sight connected to a shearing shed (I wonder why we didn't see any farm animals!)

At the appointed time operation commenced on HF (TS930S) with myself (VK3DD) operating and Allan (VK3QL) pencilling. VHF/UHF was shared around with Lynn (VK3DKE), Graeme (VK3GPT), and Steve (VK3TSR) trying hard to make a few contacts from what turned out to be a not very suitable location for these bands - oh well, it was fun trying anyway!

Whilst the HF station saw many members operating it was soon obvious that Bruce (VK3ZUQ) was both adept and keen to be the "penciller" for the weekend (perhaps he gained his experience with a bookmaker?!)

During the course of the weekend a rather large, warm fire was lit a little way from the shed and barbecues were not the order of the day on Saturday

night and Sunday — many thanks to Carol, Dot and Joan.

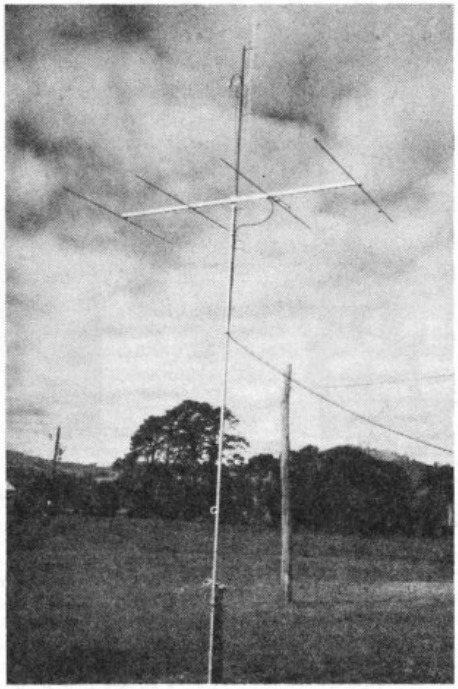
During the weekend we had a fairly solid core of stayers with others attending at various times with a visit from the local press late on Sunday.

Those attending the weekend were: – Graeme (3GPT) and Carol, Derek (3DD), Lynn (3DKE), Steve (3TSR), Allan (3QL), Bruce (3ZUQ), Colin and Joan, Telford (3TWJ) and Dot, (plus 1st harmonic Dave), Neale (3BOS) and Lisa, Ken (3TKQ), Gavin (3TLN) and John (apologies to anyone missed).

Total contacts were in the order of 390 on HF and 40 on VHF/UHF (at the time of writing, logs have not been checked).

The weekend was enjoyed by all those present notwithstanding the cool overnight temperature — minus 1 with a white frost on Sunday morning.

What have we learned from the weekend? — Well we have discovered that taking contests out into the field has a very positive effect on attendance — large numbers (from memory the last contest at the club had a roll-up of 5) From this viewpoint the weekend was a resounding success. Dare I say more trips of this nature are guaranteed? We also found that various members fall quite naturally into various roles – even those who simply helped set up and then just watched seemed to enjoy it. We discovered a "natural' log–keeper for future events (Bruce doesn't seem to need any sleep so I guess we will have to operate all night in future!), – he also doubles as a teller of well–timed jokes learned, no doubt, over his 80 plus years in a variety of situations!



6m beam with 2m vertical

In closing this somewhat rambling diatribe I must express sincere thanks to all who attend, all stations contacted, the cooks and bottlewashers, the mysterious "gnome' who kept my Port glass reasonably well filled and last but by no means least a very warm thanks to Brian with whose help and hospitality we wouldn't have had a shed from which we operate. I think Brian also found out just how "mad" Amateurs can be.

See you all next year!

73 de Derek (VK3DD) **ar**

BOOK REVIEW

Radio in Australia

BY JOHN POTTS

ISBN 0 86840 331 8. New South Wales University Press, Sydney 1989.

Reviewed by Colin MacKinnon VK2DYM

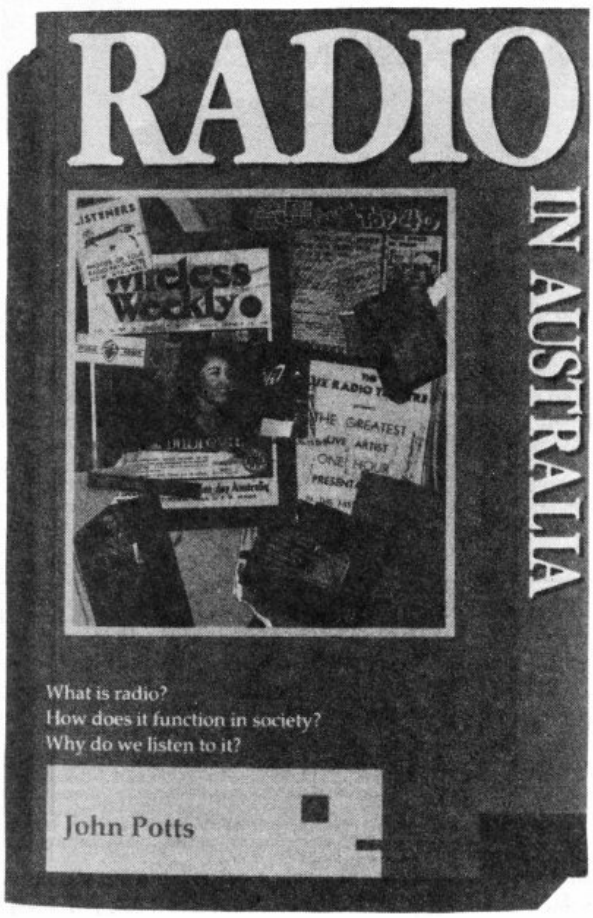
Subject: Social aspects of radio as a communication medium.

John's book has little to do with the dry, technical history of radio but I include it because it gives a perceptive insight into what funny people we radio freaks are.

Amateurs look upon ham radio as a hobby, a means of communication with kindred souls or a technical pursuit. John examines radio as a social phenomenon and shows how it has shaped community attitudes and in turn has been cultivated to meet community expectations. The book briefly covers the period from about 1900 when the very few amateurs of that time communicated with each other mostly for technical experiments, to the 1920's when commercial broadcasting made radio listening a public pastime. The book continues through to the present day, studying such aspects of modern radio as "talk-back" radio and, as James Dibble put it at the launch of the book - "Insult radio". This publication of 190 pages is worth reading to understand how others perceive radio in our society, and perhaps what they think of "hams". John finds that we are commonly portrayed as "anachronistic amateur operators, derided in trade journals as eccentric loners".

There are a number of black and white illustrations taken from early magazines and used to demonstrate the changing focus of radio over the years.

The book is A5 in size and is currently available from ABC bookshops or via NSW University Press at a price of $19.95.



YOU'LL APPRECIATE THE QUALITY... YOU'LL LOVE THE PRICE!

FT-747GX BUDGET H.F. TRANSCEIVER

The FT-747GX is a compact SSB/CW/AM and optional FM transceiver providing 100 watts of PEP output on all 1.8-30MHz amateur bands, and general coverage reception from 100kHz to 30MHz. Convenient features include a front panel mounted speaker and easy to read digital display, dual operator selectable tuning steps for each mode, dual VFO's for split frequency operation and 20 memory channels (eighteen of which can store spilt Tx/Rx frequencies). Wideband 6kHz AM, and narrow 500Hz CW IF filters are also fitted as a standard feature. Includes Yaesu MH-1 hand microphone. See ARA Review — Vol 11, Issue 11.

Cat D-2930

2 YEAR WARRANTY!

$1199

Our Most Rugged HF Mobile Transceiver!

ALL MODE HF TRANSCEIVER FT-757GX II

Ready for action! Whether in a demanding H.F. mobile situation, or at home in the shack, the FT-757GX II won't let you down. Based on its popular predecessor, it features the heavy duty die-cast heatsink and rugged metal chassis of the earlier 757GX, but has been upgraded to offer a number of new features. These include...

- All mode operation — SSB, CW, AM, FM(160m-10m)
- 100 watt output on SSB, CW, FM (25W AM) at 100% duty cycle
- High performance general coverage receiver — 150kHz to 30MHz
- Dual VFO's with single button VFO/memory swap functions
- Memories store freq. and mode, plus provide band scanning.
- Inbuilt 600Hz CW IF filter, IF shift and IF notch filters, variable noise blanker, Speech Processor, iambic CW keyer, and SWR meter.
- Includes MH-1 hand microphone.

Cat D-3492

2 YEAR WARRANTY! *SAVE $100* **$1695**

FT-212RH MOBILE 2M FM TRANSCEIVER

2 YEAR WARRANTY! *SUPER VALUE*

With 45 watts output over the 144-148MHz range, a rugged diecast chassis for superb RF isolation, extensive use of surface mount components, and a large back-lit LCD with bargraph PO/S-meter. The FT-212RH is an ideal mobile FM transceiver that also doubles as an easy to use base station. Features include 5 selectable tuning steps, a total of 21 memories (18 general purpose, one CALL-channel, and 2 sub-band limit memories for band scanning), inbuilt C.T.C.S.S. encode, as well as a variety of scanning functions. The FT-212RH comes with a mobile mounting bracket, convenient MH-14A8 microphone, and DC power lead.

Cat D-3494

$499

FT-4700RH DUALBAND MOBILE FM TRANSCEIVER

2 YEAR WARRANTY!

Features 50 watts output on 2m, and 40 watts output on 70cm (430-450MHz), with Full-duplex crossband operation or dual-band reception modes, you can listen for calls on both bands simultaneously, or work someone on one band while listening on the other. The optional YSK-4700 extension cable allows the main body of the transciever to be installed remotely, while the front panel mounts conveniently on the dashboard. The amber back-lit LCD shows both VHF and UHF frequencies and signal strengths, and all controls are back-lit for clear readability, with a dimmer switch for nightime viewing. A total of 20 memories and 5 selectable tuning steps make frequency selection easy, while the advanced scanning features allow quick detection of signals on either, or both bands.

Cat D-3300

Cat D-3301 YSK-4700 extension cable $49.95!

SAVE $100 **$899**

NSW • Albury **21 8399** • Bankstown Square **707 4888** • Blacktown **671 7722** • Brookvale **905 0441** • Bondi **387 1444** • Campbelltown **27 2199** • Chatswood Chase **411 1955** • Chullora **642 8922** • Gore Hill **439 5311** • Gosford **25 0235** • Hornsby **477 6633** • Hurstville **580 8622** • Kotara **56 2092** • Liverpool **600 9888** • Maitland **33 7866** • Miranda **525 2722** • Newcastle **61 1896** • North Ryde **878 3855** • Orange **618 400** • Parramatta **689 2188** • Penrith **32 3400** • Railway Square **211 3777** • Sydney City **267 9111** • Tamworth **66 1711** • Wollongong **28 3800** **ACT** • Belconnen **(06) 253 1785** • Fyshwick **80 4944** **VIC** • Ballarat **31 5433** • Bendigo **43 0388** • Box Hill **890 0699** • Coburg **383 4455** • Dandenong **794 9377** • East Brighton **592 2366** • Essendon **379 7444** • Footscray **689 2055** • Frankston **783 9144** • Geelong **232 711** • Melbourne City 399 Elizabeth St **326 6088** & 246 Bourke St **639 0396** • Richmond **428 1614** • Ringwood **879 5338** • Springvale **547 0522** **QLD** • Brisbane City **229 9377** •Buranda **391 6233** • Cairns **311 515** • Chermside **359 6255** • Redbank **288 5599** • Rockhampton **27 9644** • Southport **32 9033** • Toowoomba **38 4300** • Townsville **72 5722** • Underwood **341 0844** • **SA** • Adelaide City **223 4122** • Beverley **347 1900** • Elizabeth **255 6099** • Enfield **260 6088** • St. Marys **277 8977** **WA** • Cannington **451 8666** • Fremantle **335 9733** • Perth City **481 3261** • Midland **250 1460** • Northbridge **328 6944** **TAS** • Hobart **31 0800** **NT** • Stuart Park **81 1977**

STORES ACROSS AUSTRALIA

DICK SMITH ELECTRONICS

YAESU STOCKS NOT HELD AT ALL STORES. PLEASE CONTACT YOUR LOCAL STORE FOR STOCK AVAILABILITY, OR ORDER BY PHONE 008 22 6610 B1271/PB

BATTERY BONUS OFFER!

FT-411E ENHANCED 2m HANDHELD

Our best 2m handheld! The enhanced FT-411E now provides both improved receiver sensitivity and better rejection of out-of-band signals, whilst retaining its compact size (55 x 155 x 32mm) and ease of use. The multi-function back-lit keypad allows fast frequency entry, plus programming of the 49 tuneable memories, setting of the programmable 'power saver' system and a host of other convenient functions. The microprocessor control system also features 2 VFOs, rotary dial tuning in 5 selectable tuning steps, a back-lit 6 digit LCD screen with bar-graph PO/S-meter, and a range of scanning features including busy channel, band, selective memory scanning and priority monitoring. VOX (Voice Operated Tx) circuitry allows hands free operation with the optional YH-2 headset. The FT-411E is supplied with an ultra long-life 7.2V 1000mAh Nicad battery pack, carry case, belt clip, 'rubber duckie' antenna and approved AC charger.
Cat D-3350

* SPARE BATTERY OFFER

2 YEAR WARRANTY

Specifications:

Frequency Coverage:	144-148MHz
Channel Steps:	5, 10, 12.5, 20 & 25kHz
Supply Voltage:	5.5-15V DC
Output Power:	2.5W @ 7.2V
Current Consumption-	
Stand-by (with 1 sec. save):	7mA
Receive:	150mA
IF Frequencies:	21.4MHz. 455kHz
Sensitivity (12dB SINAD):	Better than 0.158uV

*BONUS CA-2 DESK CHANGING STAND
SAVE $39.95

$449

Ultra Compact

FT-23R 2m HANDHELD

2 YEAR WARRANTY

The FT-23R is an ultra-compact (just 55 x 139 x 32mm) microprocessor controlled handheld transceiver that offers extremely rugged construction and exceptional ease of use. It covers 144-148MHz and features 10 memories, 6 digit LCD with PO/S-meter, band/memory/priority scanning, 1MHz up/down stepping, repeater reverse operation, selectable tuning/scanning steps, diecast transceiver casing, FNB-10 600mAh NiCad Battery pack giving 2.5 watts output and rubber gasket seals around all external controls and connectors. It comes with a mini 'rubber duckie' antenna, carry case, belt clip, and approved AC charger.
Cat D-3490

* BONUS FBA-17 DRY CELL CASE,
SAVE $19.95

$369

* SPARE BATTERY OFFER

Specifications:

Frequency Coverage:	144-148MHz
Channel Steps:	5, 10kHz, 1MHz
Supply Voltage:	6-15V DC
Current Consumption-	
Stand-by:	19mA
Receive:	150mA
Sensitivity (12dB SINAD):	Better than 0.25uV

2m & 70cm In One!

FT-470 DUAL-BAND HANDHELD

Dual-band performance at its best! The FT-470 is a very easy to use handheld transceiver that offers a high degree of flexibility through the use of a sensible microprocessor control system to provide both 2m and 70cm operation in one compact unit. Dual independent IF circuits allow several functions to be performed simultaneously, including dual-band reception, and full cross-band operation.The FT-470 also has 21 tuneable memories and 2 VFOs per band, plus inbuilt C.T.C.S.S. (tone squelch) with a paging facility and a wide variety of scanning functions. A back-lit LCD screen shows a 5.5 digit frequency display on both bands simultaneously and bargraph PO/S-meter lets you know exactly what you're doing. A programmable 'power-saver' system helps maximise battery life, allowing squelched receive current of as low as 7mA. The FT-470 comes with an ultra-high capacity 7.2V 1000mAh NiCad battery pack, carry case, belt-clip, dual band antenna and approved AC charger.
Cat D-3360

* BONUS
BATTERY OFFER

Purchase any of these Yaesu handhelds before Christmas, and you can purchase a spare FNB-14 1000mAh NiCad battery pack (D-3351) for just $69. Save $30!
This offer supercedes all previous offers.

Specifications:

Freqency Coverage:	144-148MHz, 430-450MHz
Output Power:	2.3W (both bands, 7.2V)
Supply Voltage:	5.5 to 15V DC
Current Consumption	
Stand-by (with 1 sec. save):	8mA (each band)
Receive:	150mA (each band)
Sensitivity (12dB SINAD):	Better than 0.158uV (both bands)
Size:	55 x 180 x 32mm

2 YEAR WARRANTY

$699*

B1271

DICK SMITH ELECTRONICS

DS XPRESS PHONE & MAILORDER SERVICE
YAESU BROCHURE HOTLINE
Outside Sydney (FREE Call) 008 22 6610 Sydney And Enquiries - 888 2105
FAX: (02) 805 1986 or write to DS XPRESS, PO BOX 321 N/RYDE NSW 2113
All Major Credit Cards Accepted. O/Nite Courier Available

YAESU STOCKS NOT HELD AT ALL STORES. PLEASE CONTACT YOUR LOCAL STORE FOR STOCK AVAILABLITY, OR ORDER BY PHONE 008 22 6610

AWARDS

STEVE GREGORY VK3OT – ASSISTANT TO FEDERAL AWARDS MANAGER

DXCC Standings list updated 1/11/91

DXCC Open/Mixed Tallies

322/373 VK6RU
322/342 VK6HD
322/330 VK3AKK
321/367 VK6MK
321/355 VK5WO
321/330 VK3OT
319/363 VK4KS
319/361 VK3YL
317/350 VK4RF
314/329 VK3AMK
313/318 VK7BC
312/314 VK3YJ
311/324 VK4AK
310/349 VK4SD
308/345 VK7LZ
308/330 WA3HUP
306/316 VK3QI
306/356 VK4FJ

304/321 VK5WV
302/339 VK3XB
299/323 VK4PX
299/310 VK1ZL
295/299 VK3CQN
293/309 VK4BG
292/294 VK2AKP
291/309 VK4UC
290/314 VK2SG
287/312 VK2APK
287/289 VK6RO

DXCC Standings List. CW

311/357 VK2QL
304/340 VK3YL
302/348 VK2EO
300/330 VK3XB
298/322 VK4RF
297/345 VK4FJ
286/326 VK3YD
280/303 VK3KS
278/313 VK7LZ
278/295 VK6HD
276/303 VK2APK
275/317 VK6RU
261/263 VK3AKK
259/291 VK3RJ
238/260 VK3TL
223/243 VK5WO
213/220 VK7BC
211/220 VK3JI

DXCC SSB/Phone Tallies

322/373 VK6RU
322/335 VK6HD
322/330 VK3AKK
321/363 VK4LC
321/352 VK5WO
320/366 VK6MK
319/371 VK5MS
319/339 VK6LK
318/360 VK4LC
318/327 VK3OT
317/333 VK4RF
314/329 VK3AMK
314/326 VKGNE
314/315 VK3DYL
313/350 VK5AB
312/314 VK3YJ
310/314 VK3CSR
309/324 VK4VC
309/321 VK4AK
308/319 VK3QI
306/326 VK7LZ
305/321 VK5XN
305/311 VK3RF
305/310 VK3AWY
305/308 VK3WJ
304/321 VK5WV
304/307 VK6AJW
304/306 VK3YZ
303/309 VK7BC
303/307 VK6HE
300/343 VK4FJ
299/300 VK1ZL
294/308 VK1WB
294/328 VK2APK
292/312 VK4PX
290/294 VK6YL
288/333 VK3JA
287/292 VK6IR
287/290 VK6IH
287/289 VK6RO
286/311 VK3JI
285/291 VK7AE
285/290 VK2DU
284/290 VK3DU
280/293 VK5OU
278/279 VK5EE
276/298 VK3KS
274/275 VK3VU
267/271 VK3CYL
266/278 VK5LC
265/281 VK2AAK
265/270 VK5RX
257/258 VK3DP
256/298 VK3NC
254/274 VK2SG
254/256 VK3GI
252/277 VK3TL
246/261 VK3VQ
245/256 VK3VK
245/260 VK3JI
225/240 VK3VQ
220/222 VK5BO
212/213 VK6YF
202/205 VK6NAT
200/201 VK4DD

QSP

Congratulations to the new place getters in the Top Ten and in the 300-up tally. Countries are as hard to get on HF as they are on six metres Hi!

Graeme VK6RO has become the first qualifier for 24MHz DXCC in Australia, in amongst his 6m country chasing.

There are at least five stations above 80 countries on six and heading for DXCC; who will be the first Australian qualifier? There are 15 in USA and about 10 in JA.

Some Notes:

VR1 British Phoenix Islands became T31 Central Kiribati

VR1 Gilbert and Ocean Islands became T30 Western Kiribati Tarawa.

VR3 Fanning and Christmas (Line Islands) became T32, East Kiribati.

VR1 Funafuti Atoll (Ellis Islands) became T2 Tuvalu.

T33 is where the Banabans were resettled.

KH1 Canton Island is also known as British Phoenix and counts as two countries.

V51 is the old ZS3, and either prefix counts for same piece of dirt.

ZS9 is Walvis Bai on the Namibian coast and is a DXCC country.

ZS1 Penguin Island has status, country No 323.

FO5 Marquesas is an outer group 350 miles from Tahiti and has no status.

KH5J Jarvis as activated by AH3C counts as part of Palmyra at the moment.

There is no action on Abu Ail.

Your 7O and 4W country counts are deleted and you have to make a new contact. Germany East is gone with the wall, so your country totals are now one less.

73 from Steve VK3OT, assistant to the DXCC Awards Manager **ar**

CONTESTS

(INFORMATION PROVIDED BY RELEVANT CONTEST MANAGERS)

DX Alerting Clusters & Contests A New Aid for Contesters(?)

Appearing in various magazines is a new technique describing "DX Alerting Clusters", which is used to give contesters and DXers alike information of some value to their operations. Reprinted below from the IARU Region 1 Contest Newsletter is an explanation of this "aid".

1. *Introduction*

The rapid spread of packet radio using digital techniques and the use of DX Alerting Clusters within Regions 1 and 2 has raised a number of problems for contest organisers. While it is only a minimal interest at present within Region 3 for the the use of Alerting Clusters, it seems possible that some clusters will eventually be established in areas of high amateur population. For those who may not be familiar with the way the clusters operate, the following may be of help.

2. *History*

Packet Radio Alerting Clusters evolved in the USA from a system developed by AK1A to enable packet radio users to connect together in an "open conference" mode to exchange information. In the USA, the packet conference concept quickly became used for the passing of DX alerts comprising calls and frequencies. working with DX and contest operators, expanded and revised the software to enable other packet operators to set up similar "open conference" stations (known as nodes), which could be linked together as a cluster. From this early beginning, the packet radio cluster system became a reality and there are now DX alerting clusters operating throughout the USA and Europe.

3. *Method of Operation*

All clusters operate in a similar manner, although there are some minor differences dependent on the way they are set up. In the UK there is one cluster operation with eight interconnected nodes, which will allow several hundred connected stations to use the facilities at the same time. The service area of the cluster is quite large and, by the use of digipeating through other packet radio stations, amateurs throughout England and Wales can use the cluster. Each user links into the nodes via their own personal computer and a simple TNC (Terminal Node Controller), through a conventional FM transceiver operating in the 144MHz or other VHF band. Additional nodes are planned to extend the coverage and to provide facilities for more users.

4. *How the Cluster Is Used*

As the nodes are interlinked, any information inputted by a user to any one of the nodes is displayed on the screen of every other user who is connected to the cluster. Although the main traffic through the cluster is DX Alerts, there are a number of other facilities available to the users. These include access to a wide range of databases covering such items as propagation forecasts, lists of QSL managers, DXCC and other prefix lists etc. It is possible to make announcements and to "talk" to any other connected user (in real time).

5 *Contest Considerations*

While the rules for most multi-operator contests allow the use of external prefix or country alerting nets, the same does not apply in regard to single-operator events where most organisers specify that no assistance of any kind is permitted. In the past, the illegal use of such nets in single-operator contests has not been a worry to contest organisers as it was necessary for the operator to monitor

the net while working the contest. This was not an easy task and even if the entrant cheated by using the nets, it was very doubtful if any advantage was gained. The development of real time computer logging programs by K1EA and others, coupled with the use of alerting clusters, has changed the position. The K1EA program includes two facilities which are causing concern to contest organisers of single-operator contests. The first is a very fast checking feature which compares the prefix which has been entered into the computer with those already logged. The second is an interface for packet cluster alerts, which are fed into the checking feature and automatically filtered so only those that are "wanted" (not previously worked) are displayed on the computer screen. Such information can be of considerable assistance to the contest entrant during any event that uses Country or Prefix Bonus or Multipliers. For example, during the 1990 CQWW Phone contest, over 2000 different alerts were displayed over the UK Cluster. A similar situation was noted during the 1991 RSGB 7MHz and Commonwealth and the ARRL and WPX contests.

6.0 Changes to Contest Rules

The use of cluster information by a single-operator entrant in an event where the rules prohibit assistance, is a serious form of cheating. While the callsigns of cluster users are automatically recorded and this information can be made available to the contest organisers, this is not foolproof. If an entrant is determined to cheat, it is already clear that some entrants have found ways to avoid the callsign being recorded. The question that is facing contest organisers is how to deal with the use of clusters during a contest. Some Societies (including DARC), have already decided to allow their use without restriction. Others (including ARRL)have introduced a new Single-Operator Assisted Section which allows the use of cluster information. A number of other Societies have maintained the "no assistance" rule, but are taking a long hard look at the position. A number of other actions are being taken and various checks have been introduced. The IARU Region1 Contest Sub-Group is keeping the situation under review and will be pleased to exchange views and provide assistance to any contest organiser in Region 3.

NEIL PENFOLD VK6NE
FEDERAL CONTEST CO-ORDINATOR

Ross Hull Contest and VHF-UHF Field Day

Full rules were published last month, and by the time you read this the contest will be well under way. If you haven't joined in yet, there is plenty of time — you only need to score your best seven days.

A reminder about recommended frequencies — please avoid using DX calling frequencies for local contest operation. There is plenty of space for all, so there is no need to form a queue on the one frequency.

I hope everyone has earmarked the weekend of 11-12 January. This is the last weekend of the Ross Hull Contest and a final chance to boost your score. It is also the weekend of the VHF/UHF Field Day, and any contacts can be counted for both contests. The Field Day scores are based on locator squares, so it will be a good opportunity to collect squares for the Grid Square Award as well.

Logs for the Ross Hull Contest should be received by 17 February, and Field Day logs by 24 February. Early logs will be much appreciated. The results of both contests will be published in the April issue.

JOHN MARTIN VK3ZJC
ar

VHF/UHF – AN EXPANDING WORLD

ERIC JAMIESON VK5LP – PO BOX 169 MENINGIE 5264

All times are UTC

50.053 JA5FFJ Japan
50.0775 VK4BRG Sarina
50.085 3D2FJ Fiji
50.095 C21?? Nauru

Six Metres

Further to last month's note, Stephen Pall VK2PS writes to say that Brian C21BR had to delay operating on six metres due to illness but should be okay now. The beacon frequency is fixed at 50.095 but the callsign is not known.

The Sarina Report

Ever-faithful Ron VK4BRG continues to supply information re activity from the northern areas of Queensland. As with other VK4s, he has had much US propagation but so far has missed out on Europe this time.

25/10: 0059-0112 2xW7 Washington State; 26/10: 2155 1xW6 Washington State, 2244-2321 6xW6; 27/10: 0012 KH3AF plus KH6 beacon, 0014 K6STI; 29/10: 2012 KP2/CT1BOH, 2015 KP4EIT, 2029-2222 35xWs in W1, W2 and VE3 areas (see below for further information).

5/11: 2351-2353 3xW4 Florida; 6/11: 12xW Florida, Georgia, Alabama, Kentucky; 7/11 2120-2248 4xKL7 all Anchorage; 9/11: 2106 to 0308; 10/11: 136xW in W4, W5, W6, W7, W9, W0 extending from Oregon to Florida, Illinois to Arizona! 10/11: 0031 TI2NA, 0052 HK4BHA, both mixed in with the W stations, 0935 P29ZGD and P29PL, 1209 VS6BG, 1921-1952 6xW, Nevada, Colorado, Oregon, 2142 ZK1CG, 2159-2232 3xTI, 2256 FO5DR; 11/11: 0018 K7ICW, 0159 K6MYC, 0231 AL7C.

Ron said the list above was the result of some fantastic propagation conditions. He has his solar-powered three-to-four watt beacon running on a temporary frequency of 50.0775. Today (21/11), it has been audible at Meningie from before 0000 to at least 0700 with signals peaking 559. Ron is also pushing up his country score very well, so there may be an exodus of operators from VK5 to Sarina!

As mentioned above, the following is an elaboration of events on 29/10 when Ron had his best-ever 6m opening to W1, W2 and VE3 areas. On 29/5/90 he had worked WA2BPE and W2CNS, both in the western part of New York State, plus openings to Washington DC and southern Pennsylvania areas. He considered these to be exceptional and wondered whether it would be possible for propagation to extend to the north-east. It did!

As a prelude, on 29/10 at 2012 the band opened to KP2/CT1BOH US Virgin Islands and KP4EIT in Puerto Rico. At 2029 that propagation shifted to Louisiana and Florida, then westwards to Texas and Arizona. After working 18 stations the band closed at 2055.

Via 28.885 Ron learned that W2CAP/1 and K6STI were checking the path from Cape Cod to southern California on 50.100. A minute later he heard W2CAP/1 at 539 and called for a two-way QSO with signals peaking to S7. Then he was called by K1IKN on SSB. Ron said he had difficulty in writing his call into the log, as his hand was still shaking after the CW contact! After settling down he went on to have 35 QSOs in the W1, W2 and VE3 areas. The footprint extended from FN03 in the west to FN41 and FN42 in the east and FN25 in the north to FN30 in the southern extremity. During the 55 minutes opening he worked four VE3s.

The footprint at this end appeared to be relatively narrow in the north/south direction, but extending east to FK8 and 3D2. These countries had propagation east to VE1YX in Nova Scotia. The new 3D2FJ beacon was copied for 45 minutes by VE1YX and probably in W1 and W2.

Ron found a degree of pleasure in providing the first VK contact for some DX stations after so many years, one nominating a period of 30 years to work VK! After adding Rhode Island, Massachusetts, New Jersey and Connecticut, Ron's US state tally is now 37 worked and 32 confirmed, but believes the remaining New England states will be difficult to obtain.

First New Zealand to Europe

Via Ron VK4BRG comes a report from Martin ZL1ANJ regarding some outstanding contacts from NZ to Europe and Africa.

A series of major solar events in early November caused temporary loss of HF propagation with accompanying geo-magnetic storms and mid-latitude aurora effects. These were short-lived and the 6m band opened on Saturday 9/11 with propagation to the USA.

From 0914 on 10/11 seven QSOs were made by ZL2KT, ZL2TPY, ZL2UBG and ZL4AAA with IK4XCC, IK4BHO and YU3ZV. These contacts were the first ZL to Europe via six metres and were made possible with the help of an Es link from ZL to VK4, and from there to Europe by F2.

The next morning (UTC) from 2000 to 2100 about 45 QSOs were made by ZL operators to the north-east states and provinces of North America. Several SSB and CW contacts were made with VE1, VE3, Maine, Massachusetts, New Hampshire and Vermont. It is very rare for contacts from ZL to these areas.

On 11/11 at 1817 ZL1ANJ worked CN2JP and CN8ST in Morocco on SSB, followed at 1825 by ZL1AKW to CN2JP and at 1905 by ZL4AAA to the same station, both using CW. These contacts were the first ZL to Africa contacts on six metres; as a result, some operators may now have WAC. The ZL to CN2 QSOs were made shortly after ZL sunrise and were long-haul F2 contacts via Central America at 90 degrees beam heading.

South Australia

This state has not shared on a scale by comparison with most other states where contacts to Europe and USA are concerned. Hugh VK5BC on 7/11 worked SM7AED, SM7SCJ and heard OZ1DJJ; 11/11 around 0000 ZL4AAA, ZL2AGI, KN5S and heard TI2NA. Col VK5RO on 7/11 between 0943 and 0947 worked G2BIR at 559 in the four-minute opening! 9/11: KH3OT; 10/11: WA6BYA, NZ5C and heard CN4ST talking to "Mario". 11/11: W7HWL, M7OB, WX7R.

Other snippets from SA. At Meningie JAs have appeared at some time on every day throughout November, often to 5x9. 3/11: 0045, V73AT. 9/11: another aurora, from 0400, also KI6KY, 2300 W5. 10/11: 0152 WD5K, 0250 WA6BYA; VK4s were available all day with the new VK4BRG beacon churning away until late in the evening. 18/11: all JA beacons in, plus a new one JA5FFJ on 50.053. Es to VK1, 2, 3, 4, 6, 7 and ZL. 22/11: 1000 VK6RO and others 5x9, 2300 VK4DDC calling Central and South America. 23/11: much Es to VK2, 4, 6 and 8 with VK8GF 5x9+ for an hour or more mid-afternoon. The beacon VK8VF is not on 50.056 but 50.0572. The Es between VK5 and VK4 was still extremely strong after 1030. A DU1 called CQ for a long time from 1000, but no takers.

Brisbane stations have been involved as follows — 8/11: OH1, 9/11: 0658 four OHs to Brisbane and Townsville. 2300: W5 to VK2, 3, 4, 5, 8 and JA. Brisbane Stations worked W4, 5, 6, 7, 8, 9 and 0, TI2NA, KL7 and VK9ND. Said to be the best US opening since 1957! 10/11: VK4s all day: 2230 VK4DDG to WA7, 2248 VK4KJL calling to South America and Caribbean and soon after was joined by VK4APG, VK4ZNC, VK4DDG and VK4KK. 11/11 was a red-letter day. 0020 VE7XF at 5x9, 0022 JD1 (this one also into Melbourne, 0241 NQ4V, W4FX, ZK1CG, OE6LOG, HK4, TI2NA; 0900 YU3EA, YU3ES, I4I, IS0GY, 1207 VS6BG.

Due to space limitations I am holding over until next month a more detailed description of the stations worked in Brisbane (VK4) and Hamilton (VK3) during October/November. They will not be published for anyone to pick to pieces, but as an indication of the variations which can take place over a distance of perhaps 1500km.

Victoria

Despite the many US stations worked from Brisbane, great conditions also prevailed in southern areas, particularly at VK3OT in Hamilton who also had a red-letter day on 11/11 when he worked 20 stations in Washington State, two Illinois, two Indiana, one Missouri, one North Dakota, two Arizona, two Oregon, three Montana, nine California, one South Dakota, two Utah, two Indiana, one Nevada, two Texas, four New Mexico, one Washington, two VE7, two Mexico, two KH6, AL7C, JD1BFI — all between 2130 and 0430; 0828-0912 YU3 and OE3. Quite a day's work! The story continues. 16/11: AH6LM, five KH6, NL7NO. 17/11: 0900 PA, G3, OH2, FC. VK5BC and VK3LK worked PA0LFB.

The Hargraves Report

Nev VK2QF missed JT1CO on 10/10 at 0345. On 18/10 there were many indicators for a band opening which culminated at 0831 in working DL8HCZ, from then until 0958 on CW he worked SM7AED, OZ1LO, OZ8RW, SM7FJE, SM7SCJ, SM7BAE, OZ2LD, DL8HCZ (SSB), PA2VST, PA0LSB and PA3BFM. This gave Nev WAC. 27/10: 0300 JAs; 29/10: 0830 JAs and ZLs.

11/11: 0907 SV1UN, 0926 weak CW built up to be CN2JP but no QSO. 12/11: 0906 CN2JP (Joel N6AMG); 15/11: 0826-0930 OE2UKL, DL1OJ, DL7AV, heard FC1JG, IV3VFP, PA0HIP. 2215 AL7FH. 16/11: 0100 KH6IJ, JAs, 0548 KH6HH, AH6LM, 0900 I4XCC, YU3ZV; 17/11: 0924 9H1BT, 9H1GR.

Nev said he believes he was ably assisted by Es in working Europe, as often he could hear VK6 and VK8 on Es while they were working Europe.

Tasmania Briefly

Maurice VK7SA advises that Frank VK7ZMF, from his central highlands estate, reports openings to ZL on 2/11 and 5/11; 3/11 to 7/11 JAs; 9/11: VK1, 2, 3, 4, 5 and 7; 16/11: KH6VP, NI6E, KH6HH plus JAs, ZL and VK2. This was considered one of the better openings for some time in the far south. On 12/11 W stations were heard but not worked; 16/11 heard VS6SIX. Thanks Maurice.

Living with DX in Karratha

Karratha is a small town in the north-west of Western Australia and I would be happy to be living there at the moment! It is the home town of Steve VK6PA, who has left his mark in Europe and a few other places. He first came on six metres towards the end of 1990 and, for the first few months, worked VKs and JAs. Since 1/3/91 he has worked 44 countries on five continents, lacking only South America for WAC.

His first rig was an Icom three-watt portable with a vertical antenna and he worked many JAs. Soon he changed to a TS680S and a 100-watt amplifier feeding a six-elemet beam at 15 metres. He was immediately swamped by hundreds of JAs, and it took him about nine days to work all JA prefixes.

During October he had 16 days of European openings and worked hundreds of stations all over central Europe, with more than 100 grid squares in IO, IN, IM, JP, JM and KM. Steve says his contact with ZA1ZJ in Albania would be the best this spring. He waited six days before his luck changed and the band opened to Albania. At the same time he worked 4X1IF in Israel. If nothing else, Steve has kept VK on the minds of European operators, thus making it possible for more amateurs here to share the contacts when they become available. I only wish he would send a few European countries down to me!

Rockhampton

Lyn VK4ALM at Rockhampton had a great opening to Europe on 19/10, working 17 stations in G and four in PA, between 0806 and 0938. He said there may have been other countries in the crush but he never had time to look for them! The band was full of G, PA, JA plus TV crud.

On 9/11 and 10/11 Lyn had an excellent opening to the USA working 27 stations plus HK4, from 2140 on 9/11 to 0226 on 10/11. On 11/11 from 0000 to 0250 KN5S and JD1BFI; 12/11 2200-2250 TI2HL, 3D2AA, TI2NA TI2KD and VK9ND — five countries in two to three hours.

Top Country Count

Bill Tyan W3XO/5 and his column "The World Above 50MHz" shows in his Six Metres Standings List that at 5/9/91 there were 49 stations claiming to have worked at least 100 countries, with 46 having confirmed that number. Heading the list of confirmations is JA4MBM with 125, W5FF 115, K5FF, 115, W2CAP/1 109, VE1YX 108, K8WKZ 105, G4AHN 102, W4CKD/8, WA1OUB 104, K1TOL 102, K5CM, LU3EX 101, N5KW, JA1BK, KA1PE 100 and with W3XO/5 nearly there with 99! Then follow 15 JAs on 100.

The G4UPS Report

Ted Collins G4UPS sends the following report for October 1991.

George PA0FM will operate at P43FM from the island of Aruba to the end of March 1992. QSL via his home address.

From Albania ZA1A was active on six metres until the end of November — on 5/10 he worked 14 countries.

Peter PY5CC has a permit for his CW keyer — PY5XX. QSL route: Peter Z Sprengel, PO Box 7, Matinhos, PR 83260, Brazil.

Hans 9X5NH in Rwanda had his first QSO on 5/10, to ZS. The next day he worked I, YU and 9H and was heard in G land.

Tarik CN8ST in Morocco has K8EFS as his QSL manager.

Bill Wiseman KM1E will be in the Bahamas from 1/12/91 to mid-January 1992 and using the callsign C6A/KM1A. QSL route via his home callsign — Bill Wiseman, PO Box 120, Woolwich, ME 04579, USA.

What is believed to be the first-ever BV-Europe contact on 50MHz took place on 19/10 with BV2DP working SV, 9H and I from around 0920.

Also on 19/10 the first-ever opening between Europe and Macao to Jose XX9JN from 0938. QSL via KU9C. Jose worked about 20 G stations amongst the many countries he worked during the opening. XX9SW is also operational from Macao. The VS6SIX beacon was audible at 569, as was VS6WV.

According to Jose EA4CGN it is now anticipated the first permits to allow 6m operation from Spain will be issued November/December.

Comment

With the advent of some very good Es propagation during the past couple of weeks, many VK signals are easily monitored here and it has been possible to observe the operating habits of stations, especially from VK2 and VK4.

I am pleased to report there now appears to be a much improved degree of discipline in operating procedures. In many cases, when a contact is initiated on 50.110 the participants immediately move to a frequency higher in the band to conduct the contact, and this is to be commended. We can only hope those who are the exceptions will eventually learn that Es contacts are not acceptable on the overseas DX calling frequency of 50.110MHz.

Auroral Propagation

Chas VK3BRZ and Ron VK3AFW have both written with an account of the auroral opening on 9/11. The first comes from Chas VK3BRZ.

Chas fired up on two metres just before 2200 for the usual aircraft enhancement signals, but found VK1BG there with much auroral garble to his signal. Swinging the antenna from the north-east to south he found the signals peaked in the south-east (145 degrees) rather than the usual south. A contact was made on phone using ESP to fill in the gaps. He then worked VK1VP and heard VK2ZAB and VK2FLR, but local 144.1 QRM prevented QSOs.

Throughout the morning both VK7 6m beacons were strong, also the Wagga Ch 0 sound carrier. Arie VK3AMZ reported ZL TV carriers and heard both the Sydney and Canberra 2m beacons. At 0530 the aurora was still strong. Still peaking south-east, VK2DVZ in Taree showed on two metres with a big signal. A phone call to Daryl VK2MZ at Forster allowed another 2m contact. Both VK2FLR and VK2ZAB returned to the scene and contact was made with VK2FLR. Contacts were made with VK5ACY and VK7XR, and VK3AM was heard in Brisbane by VK4KZR, but no contact.

Those involved included VK3s AMZ, AFW, DUT, BDL, XRQ, TU and BRZ. At darkness the clouds departed and so did the aurora. Chas worked four call areas and the longest distance worked by aurora to VK2DVZ. He says there should be plenty of auroral activity in February; so far there has been at least one aurora per week since September.

Pointers to a likely aurora come from the WWV solar-geomagnetic report at 15 and 45 minutes past the hour. An announcement of a geomagnetic storm and a K index above four can mean an imminent aurora. Check the Tasmanian beacons on 52.370 and 52.470 and Mount Gambier 144.550. Auroras occur in both the day and night. The use of medium speed CW, about 10wpm, is preferred, but SSB can be used with difficulty. While the bulk of the work with auroras is on six and two metres, it should also be possible to work on 70cm.

Ron VK3AFW, referring to the aurora on 9/11, said Arie VK3AMZ observed the 2m band started coming to life at 1830 and Ian VK1BG phoned for a contact at 2200, and until the band closed at 2240 Ron had worked VK1VP and VK2FLR on CW and VK1BG on SSB. A strong signal was heard from VK2ZAB with no contact. VK3XRS was also enjoying the conditions.

Activity recommenced around 0500 with contacts to VK3AIH Portland, VK3ZQB Port Fairy (who was strong enough for an attempt on 432.1 without result), VK7DC Burnie, VK1BG and VK1VP Canberra, VK2DVZ Taree, VK2MZ, VK5ACY Kangaroo Island, VK2FLR. VK7XR was worked on the direct path at 0730 for Ron's last contact. The following morning, 10/11, the 2m band was quiet, but around 2050 Noel VK3AUG in Frankston worked VK3BRB in Mildura for a good distance contact.

Aircraft Enhancement

This mode continues to provide reliable, if short, contacts between VK3 and VK1 and sometimes VK2 on 144 and 432MHz. Doug VK3UM has best results working the VK2s. Newcomers include Ted VK2ARA on 4/10 and Chris VK1DO on 5/10. Both the above plus VK3ELV worked Bill VK5ACY on 19/10 by this mode.

Via aircraft enhancement on 10/11 at 2139 Ron VK3AFW worked Ian VK1BG on 144.2 and 432.2. At 2142 Ron worked Eddie VK1VP; at 2145 his first 70cm QSO with Gordon VK2ZAB. The enhancement was produced by an Ansett Airlines 727 flying at 41,000 feet.

Ron VK3AFW and Andrew VK7XR are presently using 3695kHz as a VHF liaison frequency and 7040kHz for a "wash-up" after aircraft enhancement contacts. Others are invited to join in.

Tropospheric contacts have continued daily between VK3AFW and VK7XR, mostly on CW. On 11/9 Joe VK7JG was 559. On 2/10 at 1215 Peter VK3XRQ and Ray VK3ACR worked VK7XR. At 1256 VK3AFW gave VK7XR his first 70cm contact to VK3 and repeated the exercise again the next day. Norm VK3DUT copied VK2YOS 400km north of Sydney on 2/10 but no contact.

Meteor Scatter

On 2/11 VK4KZR conducted tests with Ian VK1BG via this mode but no QSO resulted. Ron VK3AFW copied two complete sets of callsigns from VK4KZR with many other short pings, one giving a signal rise to S9.

1296 to Albany

It has been reported that on 21/11 at 1330 (midnight local) Ron VK5KJL in Adelaide had a contact with Wally VK6WG in Albany on 1296MHz with signals to 5x9+ over the 1900km path. That's a good effort and shows dedication to be able to initiate a contact at that time of night.

Closure

Considerable information arrived on my desk this month, and much time was spent ensuring everyone was given some coverage without repetition. I hope I have not missed anyone; and, thanks.

Closing with two thoughts for the month: "Beauty contests didn't start in Hollywood or Miami. They began when the second woman arrived on earth," and "In an argument it's hard to beat the man with the lowest temperature." All the best for 1992 and 73 from The Voice by the Lake.

ar

AMSAT

BILL MAGNUSSON VK3JT – 359 WILLIAMSTOWN RD YARRAVILLE 3013

National Co-ordinator
Graham Ratcliff VK5AGR
Packet: VK5AGR@VK5WI
Please take note of the
AMSAT information nets:
AMSAT AUSTRALIA net:
Control station VK5AGR
Check-ins commence at 0845z
on Sunday nights
Bulletin commences at 0900z
Frequencies 3.685MHz or 7.064MHz.
At present 7.064MHz is used.
AMSAT SW Pacific net:
2200z Saturday on 14.282MHz.

Experienced satellite users and newcomers alike are welcome on the nets. A large body of experience is on hand to answer queries. Listen to the WIA Divisional broadcasts for regular AMSAT information.

AMSAT Australia Newsletter and Computer Software:

Satellite users, whether experienced or newcomers, will benefit by subscribing to the AMSAT Australia newsletter and software service. The newsletter is published monthly by Graham VK5AGR. Subscription is $20 payable to AMSAT Australia, addressed as follows:

AMSAT Australia
GPO Box 2141
Adelaide 5001

The newsletter provides up-to-date information on all current and planned satellite activity. Graham also provides a first class software service for satellite users. New software is reviewed regularly in the newsletter.

Sunday Evening Net: Please note the change in time. Due to a large number of requests, and after much discussion, Graham has decided to change the starting time of the net to 0900z. Forty metres will continue to be used but watch for a possible change to 80 metres if propagation is not satisfactory at the earlier time.

RS10/11 and RS12/13

These satellites continue to give excellent service with good contacts being made. Regulars still complain of rather poor usage with only a sprinkling of stations operating on most orbits. These are excellent satellites for beginners, requiring only basic equipment to get quite good results.

30 Years of Oscars

Doesn't time fly? This month sees the 30th anniversary of the launch of Oscar-1 on 12 December 1961. Those who go back that far will recall the hi, hi, hi beacon which propelled amateur radio into the space age. Compare that with a current amateur radio satellite like UO-14 with its 9600 baud BBS and complex telemetry and control systems. We've come a long way, baby, but it's well to recall that we were just as enthralled by the performance of Oscar-1. Where will the next 30 year take amateur radio satellites?

MIR Report

After a period of sparse activity Sergie seems to be becoming more active. Several good voice contacts have been heard. Peter VK3CPO reports he has recently uploaded a message to the PMS after quite a bit of trying. There have been rumours of the packet system causing interference to other equipment on board. This could account for the somewhat reduced packet activity recently. Signals have not been as strong as normal lately. There is some indication that the amateur radio antenna may be shielded by a recent additional structure. Let's hope these problems are fixable.

Oscars 24 and 14

These satellites continue to give excellent service, with many new files appearing each day. Some small software changes are being planned to improve the performance even further. Watch for possible slight changes in operating procedures. These will be advertised well in advance.

Microsat Gateways

I mentioned a couple of months ago that there were at that stage 20 or so gateway stations set up world-wide to automatically feed BBS-type messages through the digital microsats and UoSats. These gateway stations are set up by satellite operators who interface their satellite digital communication station with their terrestrial packet station. With automatic antenna tracking and automatic file transfer facilities, such a gateway station can be very efficient. A terrestrial packet user in the vicinity of a gateway station can forward mail to that station addressed to an overseas station "via satellite" and it will be automatically forwarded via one of the amateur radio packet satellites to the appropriate gateway station overseas. The mail will then flow on to the destination station by normal terrestrial packet means. The more gateway stations we have, the more efficient the system becomes. The network has now been expanded to 24 stations. They are KI6QE, NL7NC, VE8DX, WA0PTV, KF4WQ, LU8DYF, ON4KVI, ZS1ABM, JA6FTL, W0SL, ZL2AMD, NU9H, W5ERO, KB4TM, EA6IC, SV8RV, NR3U, LU1ESY, YB0QC, VK5ZK, LU7ABF, OH6KG, EA8RT, 4X1AS. As you can see, the stations are well spread out around the world and we in Oceania are well represented. A packet BBS message is doing the rounds presently showing details of how to use this system, including those all-

Satellite Activity for August to October 1991

1. Launches

The following launching announcements have been received:

Intl No	Satellite	Date	Launch Nation	Period min	Apg km	Prg km	Inc deg
1991-							
061A	IRS-1B	29 Aug	India	102.7	915	859	99.2
062A	SOLAR-A	30 Aug	Japan	98.0	795	526	31.3
063A	STS-48	12 Sep	USA	95.4	553	538	56.9
063B	UARS	15 Sep	USA	96.2	575	574	57.0
064A	COSMOS 2155	13 Sep	USSR	23h56m	35850		1.3
065A	MOLNIYA 3-41	17 Sep	USSR	12h17m	40859	464	62.7
066A	COSMOS 2156	19 Sep	USSR	89.6	369	176	68.1
067A	ANIK-E1	26 Sep	Canada	35952	268	4.0	
068A	COSMOS 2157						
to	to	28 Sep	USSR	114.0	1438	1431	82.6
068F	COSMOS 2162						
069A	SOYUZ TM-13	02 Oct	USSR	90.2	312	276	51.6
070A	FOTON 4	04 Oct	USSR	90.6	417	223	62.8
071A	COSMOS 2163	09 Oct	USSR	89.3	331	174	64.8
072A	COSMOS 2164	10 Oct	USSR	94.5	720	290	74.0
073A	PROGRESS M-10	17 Oct	ussr	91.2	360	304	51.6
074A	GORIZONT 24	23 Oct	USSR	24h07m	36003		1.4

2. Returns

During the period 116 objects decayed, including the following satellites:

1971-059A	METEOR 1-9	27 Aug
1975-056A	COSMOS 744	12 Oct
1986-017DV	MAK-1	18 Oct
1990-022A	COSMOS 2060	01 Sep
1991-034A	SOYUZ TM-12	10 Oct
1991-057A	PROGRESS M-9	30 Sep
1991-058A	RESURS-F13	20 Aug
1991-063A	STS-48	18 Sep
1991-070A	FOTON 4	20 Oct

Bob Arnold VK3ZBB

important hierarchical addresses. Using these gateway stations to forward messages via satellite usually results in 24-hour forwarding, and 24-hour turnaround is becoming common, particularly if the originating station and the destination station are both in VHF or UHF range of gateway stations. Of course you can do it yourself with even quick turnaround time if you have a satellite station, but this service is provided by the satellite gateway operators to allow those with only normal terrestrial packet facilities to forward messages overseas by amateur radio satellite.

ar

HOW'S DX

STEPHEN PALL VK2PS – PO BOX 93, DURAL 2158

... and a happy new year to you all. Let's wish each other good health, good propagation, less interference by individuals and authorities and, above all, plenty of new DX!

My new year's resolution is to continue to give our readers the most up-to-date DX news based on the quality and quantity of the information which reaches my desk and ear each month.

It is now more than two years since this column has acquired a set format. During this time I have received many letters, with very few exceptions, complimentary about the contents of this column. However, not one of the letter-writers commented about the usefulness of publishing the RTTY News. Please tell me, is the brief RTTY information of any benefit to you? If you are an RTTY enthusiast I am sure you receive each week the extensive RTTY Bulletin of VK2SG which goes around the world making, it seems to me, this subsection unnecessary.

There is another angle to this question. There are so many DX happenings these days that the length of the column is growing from month to month. I fully sympathise with our Managing Editor's feelings when he tells me he is aiming for a well-balanced issue of the magazine each month. So, before I leave the RTTY News out of the column, I am asking for your comments. Please grab a piece of paper and send me a note and tell me what to do? Tell me: how can I retain all the news in this column in a more compact form?

The Bangladeshi Saga — S2

The much-awaited activity from Bangladesh by Jim Smith VK9NS and Kirsti Smith VK9NL did not eventuate. Jim and Kirsti were in Bangladesh. Kirsti returned from there after 10 days; Jim returned, as planned, after four weeks in Dhaka.

The following is a summary of the events which took place over there. I had a long discussion with Ken VK5QW who knew some of the details of the past few weeks.

After the 28 August decision by the Bangladesh authorities to introduce amateur radio, the outside world felt that amateur activity from that country would start shortly. The president of BARL, Saif, and the secretary Nazim, were allocated the S21A and S21B callsigns.

The block of "Z" suffixes was apparently allocated to visiting foreign amateurs. This is how Jim and Kirsti got their S21ZA and S21ZB callsigns. Shortly after arrival, Jim discovered that being allocated a callsign in Bangladesh, for which the applicant pays the once-only sum of Tk100 (taka is the name of the local currency, about $30.00), does not mean the person is now allowed to operate amateur radio. A licence has to be obtained for the equipment to be used, which costs Tk5000 annually. Jim also discovered the rules and regulations for the licensing and for the use of amateur equipment have not yet been finalised by the local authorities, who suddenly saw a number of problems in connection with the activity of visiting foreign amateur radio operators. The problem of "monitoring and security" has raised its ugly head again. The authorities are convinced that, for security reasons, they have to monitor all amateur traffic originating in the country.

There is also a local belief that visiting foreign radio amateurs will make so many contacts initially that, for the next two or three years, no other outside amateur might want to contact that country. Jim wonders who are the persons who were instrumental in floating these ideas to the local authorities.

After callsigns were allocated to two of their own nationals, the BTTB office was swamped with applications. About 10 expatriates who had been working in Bangladesh for several years past, and some 15 local nationals and some foreigners have also applied for callsigns and licensing. No wonder the BTTB office is now under stress. Whilst in Dhaka, Jim attended about a dozen meetings with various government officials and interested parties concerned with setting up the infrastructure for amateur radio activity. Among others, the following subjects were discussed: (a) reciprocal licensing with USA, UK and Australia; (b) amateur radio qualification standards; (c) amateur radio licensing standards; (d) security — this includes security checks on foreign visiting radio amateurs, and matters connected with passports and visas; (e) monitoring radio amateur activity on a 24-hour basis. There was even a suggestion to designate two localities only from which visiting foreign amateurs could operate, as this would make the physical monitoring easier for the authorities; (f) problem of the controlling and supervising of the importation and transit of amateur equipment. Out of the 18 points discussed, about one third was aimed at foreign radio amateurs. These and other recommendations have now been submitted to the Bangladeshi Government Security Branch and a reply is expected some time in December.

I said this in last year's December issue at the end of the news dealing with Bangladesh: The mystery of the East has engulfed ama-

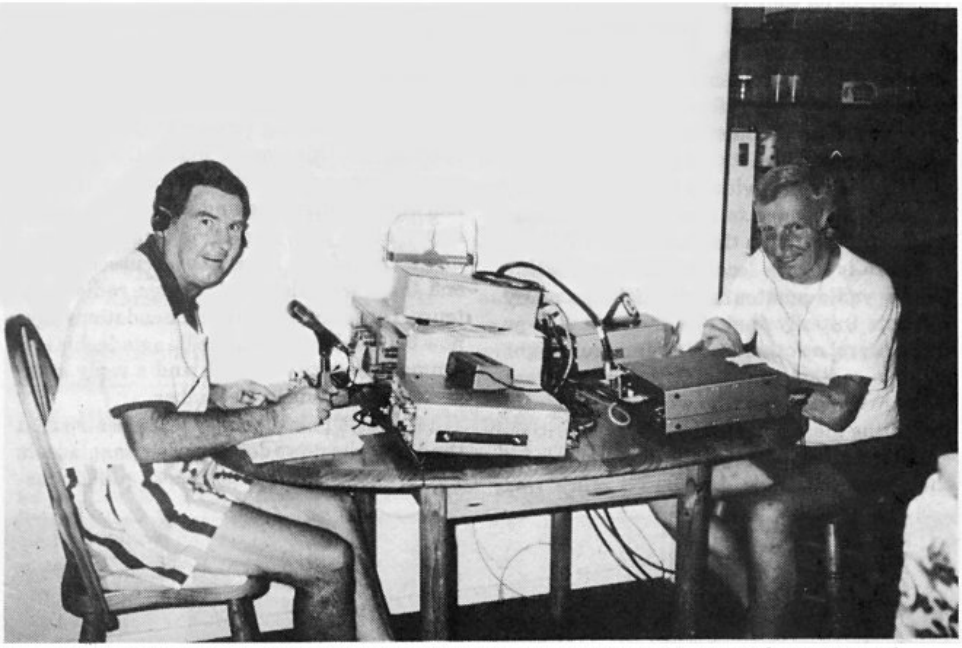
The "gang" on Fraser Island. L to R: Jim VK4RJF, Art VK4LAC, Bob VK4ERW, Kerry VK4MZ, Jim VK4WJB and Gray (seated) VK4OH.

teur radio again. I would rephrase this sentence now as follows: The mystery of the East and amateur radio politics have muddied the case of amateur radio again.

Albania — ZA

After the successful activity of ZA1A and the various other groups ZA1QA, ZA1HA, ZA1DX, ZA1'ZXV, ZA1ZMX and ZA1ZXV, the following stations were also active for a short period (QSL info in brackets): ZA0RS (HA0DU), ZA0DXC (PO Box 79, Paks 703, Hungary), ZA1SXB (JH1EDB), ZA1ZGV (JR6GV), ZA1ZSW (op was W7SW but QSL goes to: I0JBL), ZA1ZJ (JA1HGY), ZA1ZLZ (JI1DLZ), ZA1ZPL (JK1OPL), ZA1ZST (JF1IST).

After the big rush of the foreign operators, the world now awaits the appearance of the local operators with the callsign suffixes starting from ZA1TAA to ZA1TAL.



Fraser Island in action. L to R: Kerry VK4MZ and Gray VK4OH in a happy mood after 3547 contacts.

British Novice Activity — 2

The first British novice licensees have appeared on air. The following are the prefixes used: 2E (England), 2M (Scotland), 2W (Wales), 2D (Isle of Man), 2J (jersey), 2U (Guernsey), 2I (N Ireland). The frequencies and modes allowed to be used: 1.950-2MHz (CW, SSB, RTTY, data). 3565-3585kHz (CW), 10130-10140 (CW), 21100-21149, 28100-28190, 28225-28300 (on all these frequencies (CW, RTTY and data) and 28300-28500 (CW, SSB).

Navassa Island DXpedition — KP1

Navassa Island, 18°N, 75°W, lies about 90 miles south of Cuba, 75 miles north-east of Jamaica and 30 miles west of Haiti. It is an uninhabited island, and the only installation presently on the island is an automatic unattended navigational light, operated and maintained by the United States Coast Guard. Landing on the island from a boat is accomplished by jumping onto a wire rope ladder which dangles about 40 feet from a cantilever catwalk. Randy N0TG returns to the island again for a week starting on 17 January. There will be four operators: Randy N0TG/KP1, Bob KW2P/KP1 and Larry K5MK/KP1. This is the second trip by Randy; the first one took place in 1978. Activity will be on 10-160m, including the WARC bands on CW and SSB.

To pay for the very expensive boat and shipping costs, the group is seeking donations. For a $5.00 donation, you will receive your beam heading chart based on your QTH (both long and shortpath heading). Send your request and donation to Randy Rowe N0TG, 2120 Reverchon Drive, Arlington, TX, 76017 USA.

The Hungarian Bus Expedition — HG5BUS

The name of the Globex Foundation (PO Box 49, Budapest 1311, Hungary) has appeared several times on the news in the past few months. It is a group of Hungarian amateurs (Gabi HG5BKG, Pista HG5CHI and Imre HA5HO) who have obtained a bus which is fitted out with HF, VHF and UHF equipment and various antenna systems. The group intends to travel around the world in about 17 months, expecting to cover 72,000km, and to have more than 100,000 QSOs during this period. They will be operating CW, SSB, FM, RTTY, AMTOR and packet on the following frequencies: 3.5, 7, 14, 21, 28, 144, 432 and 1296MHz. The mobile expedition is already on its way. The present tentative route is USSR, Turkey, Iran, India, Pakistan and Myanmar. Last report heard them operating as UA/HA5BUS.

Future DX Activity

* Lanny W5BOS and Bob W5KNE (editor of *QRZ DX)* will be active from Christmas Island in the Indian Ocean from 11-24 February.
* Expect to work Bob 9K2ZZ from Kuwait, where he will be for the next three to four years.
* Ron ZL1AMO will be active from Kermadec Islands (ZL8) in March 1992. He is very confident of obtaining permission to activate this DX country. However, the $20,000 transportation cost poses some problems. Donations will be appreciated to the following address: Kermadec DX Expedition, c/o Ron Wright ZL1AMO, 28 Chorley Ave, Massey, Henderson, Auckland 1208, New Zealand.
* South Sandwich DXpedition. This will now take place from 21 March to 4 April. Planned operation will be for 14 days from 160m to 10m, SSB, CW, RTTY — also 6m and 2m EME. So far, seven of the planned operators have already committed themselves by contributing $5000 each. Private donations should be sent to Gerry Branson AA6BB, 93787 Dorsey Lane, Junction City, OR, 97448 USA. South Sandwich was third on the 1991 most wanted countries list, after Albania and Burma.
* Qatar — A7. A71CH is a new active amateur on the bands. QSL to: Khalid, PO Box 1156, Doha, Qatar. Mozambique — C9. C9RZZ is activated again by SM7DZZ. He was heard on 14250 at 1545 UTC. QSL to: SM7DZZ.
* Jose CE9GEW was heard operating from South Shetland Island. QSL to: Jose Garcia, PO Box 74D, Punta Arenas, Chile.
* Iraq now has five individual amateur stations in addition to the usual club station: YI1BGD.

The Fraser Island Adventure — OC-142

The nine-day activity by the Hervey Bay Amateur Radio Club from this, the world's largest sand island, was a great success. VK4CHB portable was on the air 24 hours a day from the Orchid Beach resort, which is on the northern tip of the island. (See *AR* Nov 1991). After a ferry trip from the mainland to the island, and a further four hours four-wheel-drive up north, the group of adventurous amateurs, including Jim VK4AJF, Art VK4LAC, Bob VK4ERW, Kerry VK4MZ, Jim VK4WBJ, led by Gray VK4OH, finally arrived at its destination. They settled in a five-roomed house which was about 20 metres

away from the cliff high-water mark and proved to be a wonderful spot for DX. Beam antennas for the various higher bands were soon erected, including six and two metres, together with dipoles for 80, 40 and WARC bands. There were four stations, two TS680s and two TS440s. The first contact was at 0701 UTC on 31 October with W8ZBK, and the final contact was at 1408 UTC on 8 November. A total of 3547 contacts were made into 105 countries, all States of the USA and all continents. The group made such an impression on the management of the resort, it decided to give reduced rates to any radio amateur operator visiting the resort from any place in the world. So, if you are in that part of the world, you better take a copy of your amateur licence and a copy of this article with you and enjoy your stay there.

Interesting QSOs and QSL Information

Note: callsign, name, frequency, mode, UTC, month.

* TF3DX-14033-CW-0900-Oct. QSL to: Vilhjalmur Thor Kjartansson, Njorvasundi 4, IS-104, Reykjavik, Iceland.
* A22GH-Gerry-21205-SSB-0635-Oct. QSL to: R G Heslop, Fairways, Meadow Drive, Bude, Cornwall, GX25-8HZ, UK.
* VP8CGQ-Peter-21175-SSB-0955. QSL to: PO Box 260 CGQ, Port Stanley, Falkland Islands.
* XX9SW-Steve-14210-SSB-1054-Oct. QSL to: S M Wheatley, PO Box 5953, Parsippany, NJ 07054, USA.
* VP2/VE7YL-Elizabeth-21020-CS-0253-Nov. QSL to: Elizabeth Lorraine Anderson, 1211, 3 Rd, Richmond, BC, V7A 1X3.
* HS0ZAA-John-14023-CW-1050-Oct. QSL to: NY2E, A B GIll, 85 St Andrews Place, Yonkers, New York, 10703 NY, USA.
* AD1S/KH9-14027-CW-1045-Oct. QSL to: Oklahoma DX Association, PO Box 88, Welston, OK 74881, USA.
* HR2BDC-Dean-21205-SSB-0542-Nov. QSL to: PO Box 7373 Eagle Pass, TX 78853, USA.
* HS1ZEB-Jodi-14227-SSB-Nov. QSL to: PO Box 678, Bangkok 10501, Thailand.
* ZF8AA-Ron-14199-SSB-1211-nov. QSL to: N8AG Arthur Geyer, 860 S Main St, Milford, MI 48042, USA.
* P29WK-George-14226-SSB-1201. QSL to: Nov. QSL to: PO Box 625, Wewak, East Sepik Province, PNG.
* FG/F6AUS-Serge-14226-SSB-1126-Oct. QSL to: F6AUS Serge Soulet, Box 54, F-79400, Saint Maixent, I Ecole, France.
* 5V7JG-Gerard-14222-SSB-0602-Nov. QSL to: F6AJA Jean Michel Duthilleul, 515 Rue De Petit Hem, Bouvignies, F-59870, Marchiennes, France.
* YJ0AJU-Ken-14009-CW-1233-Nov. QSL to: WA6ZEF Kenneth D Watson Sr, 1248 North Cypress Ave, Ontario CA91762, USA.

RTTY News

Quite a lot of RTTY news. Here is a small sample as supplied by Syd VK2SG. Please note my comments about the usefulness of this news at the beginning of this column. You should expect some RTTY activity from Clipperton Island and South Sandwich Island in March this year.

* 8P9HR-21081-1224Z. QSL to: KB4AI.
* HI8AX-14082-0640Z. QSL to: Box 115, Santo Domingo, Rep of Dominicana.
* ZA0DXC-14086-1116Z. QSL to: Box 79 Paks 7031, Hungary.
* Z21HJ-21085-1950Z. QSL to: Box 395 Highland, Harare, Zimbabwe.
* ZA1ZDB-14083-1530Z. QSL to: JH1EDB.
* XQ0X-14090-0018Z. QSL to: CE3ESS.
* TA5C-28082-1214Z. QSL to: Box 73, Adana, Turkey.
* VQ9QW-21085-1728Z. QSL to: Cdr Webb USN, Diego Garcia, GPO AP 96464, USA.
* S79PDL-21085-1857. QSL to: Box 448, Victoria, Seychelles.

ZA1A made 1328 RTTY contacts with 63 countries. The bulk of the contacts were with Europe, North America and Asia. Africa had three, South America nine and Oceania 11 contacts.

From Here and There and Everywhere

* Jean Claude of Crozet FT4WC, gives his QSL manager as F6GVH (see July '91 *AR*). However, the correct address of G6GVH is: Godefert Michel, PO Box 35, Villemandeur, 45700 France, and not the address which is shown in the 1991 International Callbook.
* Brian C21BR will be at Nauru for the next 18 months. He and Reuben C21RK have decided they will bring up to date the Nauru Amateur Radio Club and station (C21NI) records, including the outstanding QSL cards, by going through the old logbooks left behind by various guest operators, some of whom never QSLed under their own cards. At present there are only three active operators on the island: C21RK, C21JM and C21BR.
* Austin VK5WO received a fax not so long ago from Karl P7KM, who is the QSL manager for the May 1991 St Peter and Paul DXpedition. Karl has indicated that he will complete all the outstanding cards for the expedition, and will send all the VK cards in bulk to Austin, who will then post them directly to the different VK stations who are waiting on these cards.
* Barry VK2AAB advised me that he was and is still getting cards addressed to VK0AC for an 1986 activity. Barry says he was never the QSL manager for VK0AC and therefore cannot reply to cards sent to him.
* If you QSL direct to South Africa (ZS), do not include IRCs for return postage as they are not accepted at the RSA post offices.
* The 6m band comes into regular usage by the Czechoslovakian stations as from 15 December 1991.
* The extinguishing of the last of the 727 burning oil wells in Kuwait was celebrated by special event stations activated in the early part of November. 9K0ZZ and 9K0LW were worked by some VK amateurs. QSL to: Kuwait Amateur Radio Society, c/o 9K2RA.
* Lloyd and Iris Colvin started their usual annual amateur radio safari. They were heard from Thailand as HS0ZAP in the middle of November. QSL to: YASME Foundation, Box 2025, Castro Valley, CA 94546, USA.
* The first radio amateur to become a cardinal is Roger Mahony, W6QYI. He was elevated to this high post in the Catholic Church hierarchy on 28 June.
* The Chad Ministry of Telecommunications has announced that amateur radio is legal again in that country as from 9 July 1991.
* Bulgarian stations have been allowed to use the 18 and 24MHz bands since 1 July last year.
* If you worked XE2/IK1EDC station, do not send IRCs. The local post office does not accept them.
* Bill VK4CRR advises that he has been appointed as QSL manager for the following Kiribati stations: T32LN, T30DP and T30RT. Send your cards with SASE to: W Horner, 26 Iron St, Gympie, Qld 4570.
* If you worked 4T0SL on 3 November, the activity was from San Lorenzo Island, off the coast of Peru (no IOTA number yet). QSL to: OA4ED.
* If you listen to the SEANET check-ins at 1200 UTC on 14320, you will find a lot of interesting callsigns. The other day there were quite a number from Thailand, West and East Malaysia, Singapore, Sri Lanka and Indonesia.
* SEANET 1992. For the first time the international annual convention of the South East Asia Net will be held outside Asia. It will be held in Darwin, and congratulations to the VK8 amateurs for securing the November 1992 meeting for their city.

QSLs Received

Note: W=week; M=month; Y=year; FM=from; MGR=manager and his call; OP=operator or callsign.

Direct cards: KP2A/KP5 (2M FM MGR WA2NHA), FT4WG (2M FM MGR F6GVH), T31AF (7M FM MGR DL2MDZ).

Bureau cards: ZB2IW (1Y 1M FM OP),

VP2EY (11M FM MGR HB9SL), 4M5T (12M FM MGR YV 5JBI), 9V1JY (12M FM OP), IZ0MR/90 (13M FM MGR I0JBL), IQ5AP (12M FM MGR IK5HHA).

Thank You

Thank you to all who helped me in this issues, especially to: VK2AAB, VK2DID, VK2LEE, VK2KFU, VK2QL, VK2SG, VK3DD, VK4CRR, VK4DA, VK4OH, VK5QW, VK5WO, C21BR, F6GVH, and the following publications: *QRZ DX, The DX Bulletin* and the *DX News Sheet.* **Good DX and 73 ar**

REPEATER LINK

Will McGhie VK6UU @ VK6BBS – 21 Waterloo Crs, Lesmurdie 6076

Making Changes

Have you ever wanted to change some aspect of amateur radio? Say a particular regulation prevented you from doing something, and by changing this regulation it would be to the betterment of amateur radio.

The changes I refer to are not personal changes. For example, changing the beacon segments or the number of repeater channels to bring about a better way of doing things. This happens all the time and the WIA spends a lot of its time doing just that. An environment that provides the best for all amateurs. A tall order.

Having played a part in bringing about some changes in the repeater scene over many past years, perhaps this may be of interest to any amateur wanting to know how do you change regulations. First, let me say I have some idea, but it is is long path from start to finish. There are areas in which I could stand corrected.

Before you start, it is important to stress that bringing about changes to amateur regulations is a slow process. Even simple changes such as slightly increasing the beacon segment on six metres can take a long time. This delay from start to finish, however, should not be seen as a bad thing. It is important that changes are thoroughly thought out, and all those it will affect given time to comment. Rapid change can cause problems, as many regulations in amateur radio are complex.

One area of confusion I have with regulation changes is: do you bother to go national and bring about an official Australia-wide change, with all the delays that are incurred, or do you seek a locally negotiated change, one that your state DoTC and the WIA sanction? I say this because repeater regulations vary from state to state. For example, one type of repeater linking is allowed in some states and not in others. Our opinion in the West is to bring about national changes so that uniformity exists all the way. This approach at times has been to our demise in the West. If you wish to see a national change to a regulation, let's explore how to go about it.

It is assumed the change you want to bring about is a good logical one and will benefit amateur radio. The time has come to make a change, be it small, to amateur radio. Usually change is mooted at club level first. Your idea is presented at a club meeting and gains acceptance. It now becomes the policy of the club to pursue this issue. Next, the issue is written up and presented to the local WIA. If the State WIA supports the idea, it has now become your state's WIA policy. Note it does not have to be voted on by the members of the local WIA, only the council. Now is the time to go Federal. Your local WIA councillor now takes the issue to the next Federal WIA meeting and tries to convince the other Federal Councillors to vote in favour.

When your local councillor has to represent concepts to others, it is hoped this person is an expert and understands your ideas. This person is the one who not only has to sell your idea, but also needs to be able to answer difficult questions about the submission. Situations that were not thought about in the original submission may crop up. This is a tall order. Well thought out and presented submissions are crucial to success for your idea.

However, as the issue may be a complex technical one, the Councillors may now hand it on to FTAC for a recommendation. FTAC may then find it necessary to seek wider comment from other amateurs.

Your proposal may end up back with you for further consultation. Often little or no input is received from other states and FTAC and the WIA have little extra to go on.

If, after all this time, the submission is now passed and becomes WIA policy, your original idea may now be the new way of doing things. Congratulations! However, this may not be the end of the road by a long way. Not all changes in amateur radio can be brought about by the WIA. Many changes can occur only with the approval of DoTC.

Your submission may now have to be presented and sold to DoTC. This process adds further delay to an already long time having passed from your first presenting your idea to your local club for support.

All this time going by can be frustrating, but this is what the democratic process is all about; rapid, quickly thought-out changes would not be good for amateur radio.

The one area where the system has limitations is, as I have already said, your Federal Councillor and sometimes others selling your idea. No one can be an expert on all aspects of our hobby, so do your homework and present a well thought-out submission.

This description may help you to understand the process of bringing about change. The old often-heard saying, "Why don't they do something about it?" should be rewritten to say, "Why don't you make the start, put it in writing and start the process moving?" **ar**

FTAC NOTES

John Martin, VK3ZJC FTAC Chairman

New VK5 Six-Metre Record

All of the 6m state records set during the last cycle have now fallen. The last to go was the VK5 record set by VK5KK and XE1GE in 1979. The new VK5 record is 16116km, set by VK5LP and P43AS. Congratulations to Eric on this new record.

Thanks

I would like to extend many thanks to those amateurs who have written with information and helpful comments as requested at times during 1991. Thanks also to the RAC representatives in each Division for maintaining the flow of information. They are Darryl Fallow VK1DF, Tim Mills VK2ZTM, David Tilson VK3UR, Bill Sebbens VK4XZ, Bob Allan VK5BJA, Glenn Thurston VK6ZGT and Andrew Perkins VK7KAP.

Thanks also to other members of FTAC's advisory panel for their help: Lyle Patison VK2ALU (microwaves), Doug McArthur VK3UM (EME), TIm Mills VK2ZTM (beacons), Barry White VK2AAB (repeaters and packet radio), Will McGhie VK6UU (repeaters), and Peter Hallgarten VK3AVE (packet radio).

Finally, my thanks to Bill Roper, the Federal Executive office staff, and editor Graham Thornton, for their friendly assistance at all times.

SPOTLIGHT ON SWLING

ROBIN L HARWOOD VK7RH – 52 CONNAUGHT CRES, WEST LAUNCESTON 7250

Well, another year has arrived! After the tumultuous events of 1991, it is impossible to predict what will happen over the next 12 months. The major activity this year will be the World Administrative Conference (WARC), which will be held in Barcelona next month. The shape of HF allocations, particularly for broadcasting and amateur services, will be decided there.

As I mentioned last month, there is less pressure now, particularly in Europe and North America, for increased allocations to the broadcasting sector, because of cutbacks, and the end of jamming has uncluttered the spectrum.

However, the Asian, African and Latin American nations could possibly push for increased access, as the major broadcasters dominate the existing spectrum.

It is official — the Soviet Union is no more. A new name for those republics wishing to join in the confederation of sovereign republics has been decided. Yet it looks as if each republic is becoming increasingly independent of this loose confederation. This will mean those republics which have not yet got an international service will rapidly do so. Radio Moscow, as the voice of the central government in Moscow, will continue, although the individual voices of the various republics will possibly speak with more confidence and authority than that of Radio Moscow.

Deutsche Welle in Cologne, Germany, recently commenced utilising Soviet Far Eastern sites to broadcast its programming into Asia. Tune to 7380kHz at 1100 UTC and you will hear their Japanese programming. The site of the sender is believed to be at Irkutsk in eastern Siberia. Before the 1100 transmission, Radio Moscow's programming in Japanese is heard, and again at 1200. The DW Japanese transmissions are also heard at 1100 on 13760kHz from senders within Germany.

Incidentally, Kol Israel has resumed its relay of the morning English language news from Jerusalem. It is on at 0500 UTC on 11588kHz. It may well be on other Kol Israel frequencies, but I haven't had the time to check on these.

Radio New Zealand International has been very interesting of late, with the recent introduction of Japanese on the weekends at 1100 UTC. The single frequency of 9700kHz is easily heard in Australia. The 17770kHz channel is usually readable, but is prone to rapidly fade out, due to the recent solar disturbances.

I have occasionally have had enquiries from various individuals regarding the shortwave frequencies of Radio Fiji. It is about 20 years or so since they were operational on HF, and there are no plans to reactivate these. Fiji is mainly on MW and FM. The Hindi program on 774kHz rarely makes it over 3LO in Melbourne here during the evening hours. Other channels suffer the same problem from Australian MW outlets.

Don't forget that Radio Nederlands has its annual Blooper tribute on "Media Network" on Thursday 2 January. It will be on the usual RN outlet of 11895kHz. It is on at 0750, 0850 or 0950 UTC. That's all for this month. Don't forget, if you have any news, you can send it to the above address, or via Packet to VK7RH @ VK7BBS.

ar

WARC 92 UPDATE

DAVID WARDLAW VK3ADW — WIA WARC CO-ORDINATOR

WARC-92 WARC for Dealing with Frequency Allocations in Certain Parts of the Spectrum

Malaga-Torremolinos, February/March 1992

We are now just one month away from WARC 92. The first ITU Administrative Radio Conference since WARC-79 that has had the reallocation of radio frequency spectrum on its agenda.

While WARC 79 examined the whole radio frequency spectrum, WARC 92 will be looking only at reallocation in limited designated parts of the spectrum.

It has been said that with the current restructuring studies that are taking place within the ITU that this could be the last of the WARCs as we know them.

Here is a Review of Actions that have been Carried Out in Order to Protect the Interests of the Amateur and Amateur Satellite Service Against the Pressures that Appeared to be Mounting

It was considered of major importance that the amateur and amateur satellite services present a unified front internationally, and this is done through the IARU International Secretariat, which co-ordinated the three regional organisations and provided material assistance for national amateur societies.

Participation in national preparation for WARC-92 if possible was considered very important for the amateur and amateur satellite service.

The IARU, at its Regional Conferences, has for many years been updating its policy as to the spectrum requirements of the amateur and amateur satellite services. Also at these conferences the current ITU climate in regard to possible Administrative Radio Conferences, which may affect the amateur service, is checked.

When WARC-92 and its provisional agenda were announced it was apparent that although the amateur service was not specifically mentioned on the agenda that this was a WARC at which the amateur and amateur satellite services were going to have to take a defensive position because of the frequencies and services involved.

It was known that a number of services that were seeking additional allocations had their eyes on some amateur spectrum.

Particularly on HF, the international broadcasting interests have for many years been after more spectrum around about 7MHz. In 1979 they failed, but indicated they would try again at the next conference that was competent, that is to say one that covered reallocation of HF spectrum on its agenda. WARC 92 fits the bill.

There are also a number of amateur and amateur satellite bands in the 1-3GHz region, a frequency range which is included on the agenda.

There are also many amateur and amateur satellite bands above 20GHz, another part of the spectrum on the agenda of the conference. While not heavily used at the present, could be very important in the future.

The IARU, realising the importance of well-documented information supporting the amateur satellite services, gathered together experts. These experts put together a considerably amount of material which was made available to all Member Societies.

In regard to the HF spectrum, this material pointed the IARU policy in regard to the 7MHz band and the essential need for access to 300kHz for the amateur service. This goal has been maintained in Region 2 but, unfortunately, not in Regions 1 and 3. Throughout the lead-up to WARC-92 the IARU has emphasised this policy.

In the spectrum above 1GHz, the IARU has stressed the importance of maintaining satisfactory sharing arrangements that already exist and also the increasing needs of the amateur satellite service.

The International Radio Consultative Committee (CCIR) of the ITU was given the task of preparing a technical and operational basis for WARC-92. This was done through a number of working parties. The IARU pro-

vided input documents and representation where appropriate. These input documents were produced by international co-operation between experts in the field.

At WARC-92 an experienced team will represent the IARU, which has observer status, being a recognised international organisation.

Observers from international organisations, while they do not have the privileges as delegates from ITU member nations, can participate by invitation.

Here in Australia the WIA has participated fully in preparation for WARC-92 with membership of the Australian Preparatory Group for WARC-92. The work of the APG to cover the agenda of WARC-92 was carried out by three major committees.

In relation to the amateur and amateur satellite services, three major areas of concern have been addressed.

Firstly, the problem of the non-uniformity of the amateur allocation between the three regions at 7MHz. Australia is in favour of harmonisation, but does not support an increase in the allocation to HF broadcasting.

Secondly, the allocation 2300-2450MHz which is currently shared with a number of other services which, although not ideal, allows those interested to make use of this part of the spectrum. The amateur satellite service is planning to make more use of its allocation of 2400-2450MHz. Australia is proposing no change in this part of the spectrum.

Thirdly, there is the desire for frequencies for wind profiler radars in the 400MHz region. These vertically pointing radars would cause severe interference to amateur satellite uplinks. They, however, could share with terrestrial amateurs on a geographic basis. Australia proposes that the matter be considered by a future WARC.

The matter of low earth orbiting satellites seeking an allocation alongside the 144MHz band does not appear to be a problem, but this matter will be watched carefully at the conference.

ar

POUNDING BRASS

GILBERT GRIFFITH VK3CQ – 7 CHURCH ST BRIGHT 3741

Continuing on from last month where we featured the Marconi School's method of learning the code, this month I will be giving parts of the manual as regards learning the **sending** of code. As far as I am aware, the sending test still requires the use of a hand key, not paddles etc. So the old rules and methods for learning sending should still apply. A word of warning, though, should this be the case. Don't start using paddles until after you have passed your exam.

"... Sending

Before commencing to send, the student must see that he fully understands what is required. The Morse key is usually adjusted so that one sheet of ordinary paper can just be placed between the contacts without tearing. The spring tension should be sufficient only to return the key to the "up" position with the fingers lightly resting on the knob. It will be seen from this that the amount of effort involved in sending is only that necessary to move the contact the distance of the thickness of one sheet of paper against a very light spring action. Sending is **not** hard work — do not make it such.

Before commencing practice, see that the key is properly adjusted as to gap and tension. Sit erect at a table with the back resting on the chair support, and the feet and legs in the same position as for receiving. All body muscles should be relaxed and kept relaxed, except for the slight wrist action, during the whole practice period. The table should be of sufficient height to allow the hand to rest on the top of the key with the wrist slightly arched so that when the key is depressed the forearm will lie parallel to the floor. The key should be firmly fixed on the edge of the table directly opposite the **right** hand, the right upper arm hanging loosely from the shoulder and directly under the shoulder with the elbow close to the body. Sit sufficiently far from the table for the tips of the fingers only to rest on the knob of the key. Form the right hand into an arch and lightly rest the tips of the first and second fingers on the top of the knob, with the ball of the thumb on the left-hand side of the knob, the third and fourth fingers hanging loosely down, but never touching the bar of the key. In this position, the wrist should be slightly arched and above the level of the elbow. Do not grasp the key tightly, as this tenses the arm muscles.

Sending with the left hand is **not** permitted as all telegraph installations are equipped for right-hand sending. A left-handed person can send with the right hand if he practises right-hand sending from the start. (**Note:** I think one should learn to send with one's non-writing hand now we don't have to work in a telegraph office. It makes note-taking much easier. Gil).

To make a "dit" drop the wrist down level to the elbow, bringing the lower arm parallel with the floor — then return immediately to the "up" position. For a dit the key is not held down; the action is a continuous one, down and up. To make the "dah" drop the wrist in the same manner as for the dit, but on this occasion leave it down for a period equal to three dits before returning it to the normal position. Do not use any force in these movements and, above all, avoid nerve sending (ie with the fingers only) of exaggerated wrist action. A beginner may experience difficulty in judging the time for dahs, therefore it is good practice to sing the symbols when sending, in a similar manner to that used in earlier receiving practice. This will give rhythm, which is all-important in Morse sending.

In sending, the right elbow must not move, but remain close to the body and relaxed. Avoid lifting the elbow away from the body, otherwise the student is supporting the whole weight of his arm, and the muscles of both the forearm and upper arm will be contracted, resulting in fatigue.

This will be very noticeable if the sender is nervous, particularly in tests.

Sending Practice

The student should now practise holding the key and forming dits and dahs. A good exercise is to form 20 dits, then 20 dahs, keeping uniform formation and speed (singing will help). Practise this until able to switch from dits to dahs and vice versa without hesitation or loss of rhythm. Next comes the formation of letters. It is of the greatest importance to remember that the symbols constituting letters and figures are made with an even, continuous flow. They must not become jerky, uneven or running into each other, otherwise they become unreadable. The component dits and dahs or the Morse symbol for a letter are sent as a continuous symbol. In other words, there is no conscious space between the dits and dahs in one letter or numeral. It is equally important to observe the correct spacing between the symbols of one letter and those of the next, and also that between the last symbol of the last letter in one word and the first symbol of the first letter in the next word.

The following are general rules for spacing and length of symbols:

(1) A dah is equal to three dits.
(2) The space between symbols which form the same letter is one dit.
(3) The space between two letters is equal to three dits.
(4) The space between two words is equal to five dits.

(**Note** from Gil: see how spaces feature in three out of four rules!)

It is better at first to exaggerate the spacing between letters and words; in other words, pause after completing each letter, keeping the pause between words comparatively long. As accurate formation of letters is obtained and speed increased, these spaces can be reduced to their proper size and a rolling or rhythmic formation obtained.

A common fault to be avoided is to run from one letter to the next without pause, particularly when the preceding letter ends with a dit or dits, or is a T or M. If a student experiences difficulty in spacing between letters, he should

practise sending at about five words per minute, by making the symbols for the letter, then removing his hand from the key, touching the table and returning immediately to the key and forming the next letter. In following this procedure an easy rhythmic speed of five words per minute is obtained.

This should not be continued indefinitely, but merely as an aid to obtaining the correct spacing at slow speeds. At faster speeds the movement of the hand to the table and back would create a space out of proportion to the speed of the symbol. Once the student advances to about 10 words per minute, his fingers should **not** leave the key until the transmission is complete.

The following exercises are suggested at this stage:

Practise five dits 20 times, five dahs 20 times alternately.

Practise d'dah 20 times and dah dit 20 times alternately.

Practise five dits and five dahs alternately 20 times.

Practise d'dah dit 20 times, and dah d'dah 20 times alternately.

Practise dah d'dah dit 20 times, and dah d'dah dah 20 times.

Practise the word **the** 20 times and **moy** 20 times alternately.

Practise each letter of the alphabet five times.

Practise each figure five times.

When formation is satisfactory the student may follow the exercises herein, not passing on to the next exercise until satisfied that the formation of all letters and figures and spacing in the previous exercises are satisfactory.

General Notes on Sending

Accuracy is the watchword. Never practise at high speed. Sending practice is muscular exercise, and must be taken as such; therefore practise at a steady pace, only occasionally speeding up for short periods. Students should not attempt to test themselves. No sender can fairly do this, for while concentrating on the clock sending is neglected.

The exercises which followed in the booklet are mainly five-letter groups such as EISH5, TMO0 etc, much the same as I experienced on a teaching cassette which I used to learn Morse. Even if you practise receiving plain English because you know it will be used in the exam, you will notice if you check some of the past exams that the words used are often selected to trap the unwary who try to journalise (ie, recognise and write down the word before all the letters have been sent). This is the most common way of causing a loss of concentration, which is often indicated by a complete lapse of memory when trying to decode the next letter or two. I am sure we have all had the experience, but if you follow the above rules, you should not have that problem in the exam.

Experienced Morse operators will agree with me when I say there will come a time, perhaps after many years of operating using Morse, that you will be able to concentrate on other tasks while listening to Morse conversations and, without consciously "copying", you will be able to follow the conversation even when you appear to have missed whole phrases at a time. You will be able to unconsciously recognise the sender as a personalised character (ie a "mate"), by the "accent" of his code sending. I don't know whether a study has ever been made of this subject, but by calling it an "accent" I refer to slight differences in spacing, rhythm, the way in which errors are corrected (or not), words used, grammar, spelling,signal strength, tone, fading, etc, etc.

If you have had this experience I would like to hear from you with your comments and ideas. It is an uncanny feeling to switch on the rig and overhear a conversation in code and immediately know for sure who is talking to whom. It can happen in the space of one "over" or even less. How does our brain do it? Why do we enjoy a code conversation with one operator and, on the other hand, sometimes shy away from a conversation with another?

So, experienced Morsiacs, your task is to have a little think about how all these processes work for you, and write your observations down and send them to me.

Don't wait for next month, try to do it today.

73

ar

INTRUDER WATCH

GORDON LOVEDAY VK4KAL – AVIEMORE, RUBYVALE 4702

The Bandung IARU Conference of R-3 is over, but the monitoring service is not. It may be news to those amateurs using 18MHz band, which became exclusive to us in 1989, that two TAFF Newsagency stations and an Argentinian weatherfax station have failed to vacate this band. A footnote to the ITU radio regulations permits the USSR to use this band! It appears their usage does not conform with the power limitations of the regulations.

An interesting trial is being run by the NZART Monitoring Service (it will be worth looking into in VK) by circulating the monthly summary of intruder reports on the New Zealand packet network, as an effective way of both informing amateurs about intruding signals and encouraging them to report non-amateur signals they hear in our bands.

A breakdown of reports for 1990 from Bill VK2COP.

WIA	JARL	NZART	Total
403	1062	429	1894 (3144 in 1989)

The format of 1989 has been changed to reflect more selectivity in reporting intrusions, so the smaller 1990 figure does not indicate a lessening of intrusions into the amateur bands, the breakdown of total:

WIA input represents 21.28% of total
JARL input represents 56.07% of total
NZART input represents 22.65% of total

The monitoring system must continue to be seen to exist, if only for its deterrent value. However, I think all in the monitoring service are agreed that the intruders will always be with us, in one form or another. My thanks to Bill VK2COP for his sterling work as R-3 Coord.

Most amateurs will be aware that the allocation of distinctive callsigns, which signify the country of the station using the callsign, is a matter covered by the International Radio Regulations (Article 25).

The military services of many countries use tactical callsigns which **do not** conform with the ITU allocations. These should still be recorded as the callsign of the intruder, even when it is clearly a tactical call. Over a period of time, the same callsigns recur and may be pieced together with other clues to provide the origin and identity of the station. One may also find, by listening to a station using these tactical calls, references to other frequencies.

Monitoring these other frequencies often rewards the patient listener with the true ID or callsign of the station which uses only the tactical callsign when operating in the amateur band. It should be noted by monitors that not all countries are members of the ITU. Non-members are **not** allocated blocks of callsigns and must of necessity invent their own. Also, some members of the ITU may, for some purposes, ie military operations, adopt their own series of callsigns. A few follow: CP95 Adm VTN/CQ5-VTN, both these the location is Hanoi, as is F9T, HZV, VRQ. Then we have RCF with a stack from Moscow URS! Z3N used to connect with Y5K in East Germany! A lot of these are so-called diplomatic stations. I can give more examples if required.

The spurii of 21480, has a tx site at SERPUKHOV (54°25'N x 37°40'E). Comment. As there are no known fundamental b/cast frequencies on the 28-29.7MHz band, those heard are harmonics. Check them out with your pocket calculator and let your co-ordinator know.

Our thanks to VKs: 2PS, 2GDF, 4BG, 4AKX, 4BHJ, 4BTW, 4BTW, 4BXC, 4CAS, 6RO, 6XW, 6BWI and 7RH.

73, VK4KAL

Freq	Date	Time Z	Mode	ID	Remarks
3530	280991	1315	J3E		Broadcast Asian
7000	2409	1148	J3E/U		Sev stns in Indonesian language
7003	161091	1300	A1A	"V"	"V" Beacon
7008	0510	2325	F1B		Hi-speed RTTY. No sh given
7008.3	130791	0942	A1A	4F2F	"8MYC de 4F2F"
7010	0310	1045	F1B		7011/7012 QSY to clear freq (14)
7014/16	161091	1240	J3E		Asian r/telephone
7015.1	2610	1150	J3/U		Sev stns, Indonesian (?)
7020	2809911020		J3E		B/caster, no other details!!!
7039	2210	0947	A1A		25wpm "712ROO FMCAE DEG"
7041.5	0410	1235	F1A		RTTY 1kHz "A47 UDNA 76 6AN4"
7042.5	2509912247		F1A	UHF3	1kHz shift(?) Idles aft ID
7049.7	0410	1240	A3E		"Sing-song" music f/announcer
14011.7	261091	0740	F1B		1000Hz/75N encrypted
14012	0810	1120	F1B		1000Hz/2hrs logged (3)
14014	2709	0545	J3E		B/caster, Indonesian lang
14026.5	111091	1000+	AC3		Wx fax/120rpm drum sp/2kHz w (4)
14035	2710	0919+	J3E/?		Rad telep/Indo military net?
14044+	mni	mni	J3E/?		24hrs 2ch r/telephone (37)
14047	131091	1050	J3E/L		Radio telephone Asian? (4)
14055.8	2710	1251	J3E/L		Indonesian Navy? M&F voices
14058+/-	dly	mni	AC3		24hrs/Ch Helschreiber (44)
14060.5	dly	dly	A1A	VRQ	5ltr & news in English (48)
14075/6	dly	mni	A1A	VRQ	mny freq to 14165 (10)
14092	011091	0930+	A1A	RGT77	Probs with Xmission, chirps (4)
	Callsigns VBX/NZB/VPC/KFB — all from same source, freq 17070-14103 (38)				

Freq	Date	Time Z	Mode	ID	Remarks
14095	271091	1300	A1A	VPC	Calling BFC (VRQ clone)
14103.5	1710	1212	XXX		515Hz Jammer
14140.5	041091	1230+	B9W		250Hz & F1B MN radio em freq (6)
14165	mni	mni	A1A	P8U	P7A de P8U QRK? K (3)
14168.5	0210	0510+	f1b		7hrs 250Hz tfc & txt of MNR (3)
14168.5	161091	0950+	XXX		4hrs. Suspect non-amateur USR? (3)
14192	3009	0935+	A1A	MNY-	Y5JJK, 6UN7, 1CNY, FBTG, VY9U & YJ5B (6)
14211.5	0410	1040	2/F1B		2ch x F1B not F7B, 250Hz USR (8)
14212	1510	1035	F1B		1000Hz + N0N (11)
14215	011091	1000	A1A	P7A	ex CQ5 P9K de P7A QSV K (16)
	Bracketed figures = no of times logged for DoTC				
14217	021091	0645+	MXD	UMS	7hrs F1B, N0N, F1CW MNradio
	Reply often on VLF 16.5KHz, N0N holds freq for F1B of 250Hz (18)				
14218	mni	mni	F1B		8hrs 500Hz/CW rmks (15)
14228	231091	1140-55		A1A	7XWX "HNGT de 7XWX Marine???
18075	2410	1213	A3E		No ID or info at this stage
21031.5	2409	mni	MXD	M N R	18hrs CW tfc is UUNS (41)
21283.5	dly	mni	MXD	M N R	12hrs F1B most used 250Hz tfc from shore stns to sea vessels USR (42)
21330	011091	1100	A3E	R/Moskva	Spurii of 21575 (9)
21342.5	2309	0800+	R7B		Gr of 3XR7B F1B/250Hz (9)
21347.5	2409	0440	A3C		24hrs. Wx fax USR (34)
21396	071091	0400+	A3E	R/Moskva	ID-1020z, Russian prog (5)

ar

KNUTSHELL KNOWLEDGE

GRAHAM THORNTON VK3IY

A brief overview of what other magazines have to say. The information given below has been supplied to the WIA free of charge by Thornton Publishing. Your divisional library may have copies of the references quoted.

Amplifiers

Landwehr Masthead Preamplifiers.

(Product Review) Peter Hart G3SJX, RadCom vol 67 No 11 Nov 1991 pp 47 - 48. il photos. A report is given on Landwehr 145MAS (2m) and 435MA (70cm) masthead amplifiers, including measured performance.

Antennas

ATUs

BNC Connectors Handle Switching in a Flexible Antenna Tuner. Zack Lau KH6CP/1, *QST* vol LXXV No 10 Oct 1991 pp 31 - 32. il ccts, diag and photo. A variable capacitor, a roller inductor and a tapped inductor may be used in various L network configurations. Selection is made by plugging a shorted BNC plug into one of four sockets. A design is given for a home-brew insulated shaft coupler.

Low-Pass Antenna Tuner. J Frank Brumbaugh KB4ZGC, *73* issue #373 Oct 1991 pp 46, 73. il cct. A T circuit, with series inductive arms and a shunt capacitor, is used as an antenna tuner. This arrangement has the advantages of also acting as a low pass filter to reject harmonics, and an earthed rotor shaft for the capacitor. The unit can also be used as an L circuit with either inductive or capacitive input. Each of the two inductors has independently selectable switched taps. It is suitable for an unbalanced antenna or feeder.

Miscellaneous

Curtains for You. James D Cain K1TN, *QST* vol LXXV No 10 Oct 1991 pp 26 - 30. il diags, graph and photo. Design details are given for an 8 element Sterba array for use on 10m. The theoretical bidirectional gain is 8 dBd. It is claimed that element length is not critical for this antenna.

Match Bandwidth of Resonant Antenna Systems. Frank Witt AI1H, *QST* vol LXXV No 10 Oct 1991 pp 21 - 25. il cct, diag and graphs. A deliberate mismatch between line and antenna increases the bandwidth of the system as seen from the sending end. The greater the inherent line loss, the more pronounced this effect becomes. By adopting this technique, the line loss over most of the band can be reduced.

VHF/UHF

Reception - A Function of Radiating Structures. B N Jansen, *RadZS* vol 45 No 9 Sept 1991 pp 4, 6 - 7. il diags and graphs. An experiment is described where the polar patterns in the horizontal plane are compared for _/4 and 5_/8 monopole antennas. The two antennas are compared at each of six positions on an Opel Monza motor vehicle; two on the bonnet, two on the roof and two on the boot. It is apparent that the pattern for the 5_/8 antenna is less critical with respect to position on the car - the worst case being a loss of 6dB in one direction. The _/4 antenna, however, showed a worst case attenuation of 12dB.

Simple Gain Antenna for 903 MHz. Phil Salas AD5X, *73* issue #373 Oct 1991 pp 25, 27. il diags. A modification to a Radio Shack U-75 UHF corner reflector beam with seven directors is described, together with an appropriate coax balun. Adjustment details are also given.

Electronic Devices

Timers

First Steps in Home Construction (7). (555 Timer) John Case GW4HWR, *RadCom* vol 67 No 11 Nov 1991 pp 34 - 36. il ccts, cmps, pcb and photo. An introduction to the use of prototype boards is presented, with the use of a 555 timer. Suggested applications are given for a 1 - 8 min on-timer, a tone generator and a pulse generator.

Filters

A Simple VHF/UHF Diplexer. David C Jenkins WB6RBE, *QST* vol LXXV No 10 Oct 1991 pp 18 - 20, 25. il cct, diags and photo. A low-pass and a high-pass filter act to combine the output of a 2m and a 70cm transceiver into a single feedline and dual-band antenna. The unit can also be used as a divider, feeding each output from a dual-band transceiver to its appropriate antenna.

Narrow Band Modes

An Optical, Through-the-Air Digital Communication Modem (1). Lawrence E Foltzer, *QEX* #117 Nov 1991 pp 3 - 8. il ccts and photos. The hardware and software for an optical digital link are discussed in detail. An LED transmitter, using a peak current of 200mA, gives a range of up to 660 feet using 1.2 inch diameter lenses. It is claimed that baud rates as high as 62,500 are possible with the technique described.

Receivers

Home Brew

The Sudden Receiver. Rev George Dobbs G3RJV, *73* issue #373 Oct 1991 pp 8, 10, 12. il ccts, cmp, diag, pcb and photo. A simple DC receiver is described which can be made to cover any amateur band between 160 and

20m. NE602 and LM386 ICs are used.

Product Review

The Drake R8 Receiver. Bill Clarke WA4BLC, *73* issue #373 Oct 1991 pp 50 - 51. A qualitative review is given for this receiver, which operates from 100kHz to 30MHz. The manufacturer's performance specifications are quoted. A computer connection is provided.

Transceivers

Miscellaneous

Microprocessor Repeater Controller (1). John Bednar WB3ESS, *73* issue #373 Oct 1991 pp 28, 30, 32, 34, 36, 38. il cct, cmp, pcb and photo. An 8749H single-chip microprocessor is used to control repeater functions. Some of these functions may be controlled by the user; others are reserved for 'superuser' activation only. It is claimed that this low cost controller contains most of the necessary facilities for a modern system.

Product Reviews

Kenwood's TH-77A Dual-Band Walkie. Michael Geier, *73* issue #373 Oct 1991 pp 42, 44 - 45, 47. il photo. A review of this rig is given without laboratory comparison of specifications.

Yaesu FT-650 6/10/12-Meter Transceiver. Jon Bloom KE3Z, *QST* vol LXXV No 10 Oct 1991 pp 33 - 36. il graphs and photo. A Review is given of this equipment, complete with laboratory measurements.

Transmitters

QRP

A 10m Sideband Transmitter. Bruce Auld NZ5G, *73* issue #373 Oct 1991 pp 14, 16, 18, 20 - 22, 24. il ccts, cmps, diags, pcbs and photo. A design is given for a 10m double sideband transmitter. Power output is 1W. Full construction and adjustment procedure is described. The equipment consists of three modules: VFO, balanced modulator and power amplifier.

Glossary of Abbreviations

il The article contains illustrations, a list of which follows.
cct A circuit diagram
cmp A component layout drawing
EA *Electronics Australia*
diag A mechanical drawing
pcb A master drawing from which printed circuits may be produced
QSTVE *QST Canada*
RadCom *Radio Communication*
RadZS *Radio ZS*
73 *73 Amateur Radio Today*

The above items are reproduced from Amateur Radio Technical Abstracts Volume 1 1991 ISSN 1036-3025 - to be published.

ar

DIVISIONAL NOTES

5/8 wave

ROWLAND BRUCE VK5OU

Well, I have just managed to find the typewriter under the boxes of Christmas cards — mine, and those which I write on behalf of Council to our many volunteers who all help to keep the WIA working. There are about 65 this year, including office bearers, broadcast relayers and the Morse practice team. (Of course, this doesn't include Council members).

It is good to note a couple of new names on the list. Tony Hurren VK5PBH has been filling in as a 2m relay operator this year, and I'm told will probably be a regular member of the team next year. Dean Whitehorn VK5ZDW has apparently been helping with ESC for several months, and his help has been greatly appreciated by Mark and David; so, welcome, and thanks to you both.

Alan Roocroft and his wife Mee Wah have now been doing the QSL Bureau for a few months, and are probably wondering how George and Thelma Luxon managed to do it for 25 years! Alan's recent comments on the broadcast are worth repeating and will make their lives a little easier.

Do sort your cards into countries.

Do write the callsign on the back top right-hand corner.

Do check with rarer DX that they have a bureau which to QSL through (or perhaps they have a QSL Manager).

Do collect your cards regularly if you are an avid DXer, or have someone collect them for you (you could save Alan from getting a hernia from carting those boxes around!)

And, last but not least, if it isn't already too late, save any cards you may be holding until the end of January, so Alan and Mee Wah can have a well-earned break, and the PO box won't be overflowing when he gets back.

The fees for 1992 for this Division have been set as follows:

Full members	$70
Pensioners/students	$56
Family member (without *AR*)	$42

(anyone can nominate not to have *AR*, if they wish)

Repeater News

The Port Augusta ARC is planning to build a 2m repeater to be sited on Mt Arden.

I believe the Elizabeth ARC is now doing a relay on Sunday mornings (of the WIA broadcast) through its new 70cm repeater.

If these, or any other, clubs would like to have information published in this column, I would love to hear from you. If you get your copy to me by the first of each month (except for Jan 1993 copy, which needs to be with me by 24 Nov '92) I will put it in the next edition.

Diary Dates

28 Jan — General Meeting Night (usually this had traditionally been a Buy & Sell night, but I've been wrong before!!)

ar

CLUB CORNER

Hervey Bay ARC

After a successful 8 days on Fraser Island IOTA OC 142, it was back to Hervey Bay for the November Examinations.

Another first for the club and for Hervey Bay our first lady operator — Liz White now VK4LIZ my XYL so very proud, other passes and subjects as follows.

VK4LAC AOCP/T, VK4NBB AOCP/T/MS/MR, VK4KAM 10WPM/S/R. Colin Reeves complete NAOCP, Mike Barrows NOOCP/T/R, Veronica TessemerAOCP T/R/5WPM S/R, Tony Haste AOCP T/R, John Hunter NAOCP T/R, Ritsie Zeeman AOCP T/10 WPM, Jim White AOCP 10WPM/S/R.

Also on 24 November a combined BBQ was held at Hervey Bay Club Rooms, members from Bundaberg, Gympie, Maryborough and Hervey Bay clubs attending with a terrific day had by all.

The club's monthly meetings are now held on the third Monday in each month at our club rooms, Dayman Park Hervey Bay. All visitors to Hervey Bay are welcome. Hope all had a wonderful Christmas.

73 Jim White VK4AJF

Secretary, PO Box 829, Hervey Bay, Q'ld. 4655

ar

Stolen Equipment

Stolen from Dick Smith's Bendigo store: Yaesu scanning receiver, model number FRG9600, serial number 5N120767.

OVER TO YOU

ALL LETTERS FROM MEMBERS WILL BE CONSIDERED FOR PUBLICATION BUT MUST BE LESS THAN 300 WORDS. THE WIA ACCEPTS NO RESPONSIBILITY FOR OPINIONS EXPRESSED BY CORRESPONDENTS.

Remembrance Day Trophy

The ultimate location of the RDC trophy may, hopefully, be in the War Memorial Museum, Canberra, safe from theft.

The museum is itself a place of remembrance, visited by thousands of the public every year. With the trophy strategically placed so as to be easily inspected by visitors, with complementary historical information nearby, I know of no better way of informing the general public about the role of radio amateurs in defence of freedom and our country.

The provision of a replica for use by the winning Division would facilitate the implementation of this proposal.

G HARMER VK4XW
35 RUTLAND ST
COORPAROO 4151

Even Trees Unnecessary?

I refer to your item concerning "Tree Antennas" on page 23 of November '91.

VK5RK tells me he tried this and was able to work to JA and other remote spots.

This brought to mind that some 40 years ago, when I lived at Largs Bay, I was able to contact a VK2 station who, after receiving my signal report, asked that I might QRX. I obliged, and he called me again.

It turned out he was using a folded dipole, lying on the ground, and had moved it around 90 degrees to see what the result was.

There was a difference of two S points in the two signals.

My only comment is, "If this is so, why do we need either masts (and/or towers) or, for that matter, even trees?"

Obviously, what you find works satisfactorily is what you should use.

My present 14MHz antenna is a ground plane, standing on the verandah roof — about 10 feet above ground. A single insulator and 250lb breaking strain nylon fishing line supports the mast (antenna) to my entire satisfaction.

Yes, I do have other radiation systems such as coax dipoles, as well as a 66ft-long wire for other frequencies.

I am left to wonder "Why?"

TOM LAIDLER VK5TL
18 ALBION AVE
GLANDORE 5037
ar

SILENT KEYS

DUE TO INCREASING SPACE DEMANDS OBITUARIES MUST BE NO LONGER THAN 200 WORDS.

Don Finlayson

Listener No L70166

Don passed away suddenly on 2 October, aged 80. He made his first crystal set at the age of 10. Later he studied for four years by correspondence to gain his Radio Technician Certificate. He was self-employed for many years and gained a wonderful reputation as a friendly repairman who took great pride in his work. He was middle-aged when television arrived, but went back to school with great glee to learn about the new medium and mastered it very well.

He was always an avid listener to amateur radio operators and, prior to his death, was planning to become an operator himself. He had also enroled for a seminar on CD players, ever anxious to learn about a new technology. The other great love of his life was Scouting.

In his younger days he founded troops in many Tasmanian towns such as Longford, Cressy, Deloraine, Margate. The Law and Promise were the essence of his love — love of God, Queen and Country; a friend to all, thrifty and honest.

In later life, the skills he learnt at Rostrum helped him express these ideals, and he became an excellent public speaker. Only a few weeks before he died he replied to a toast at a Scout Reunion and a stranger remarked he had never seen a man with so much enthusiasm.

A fitting tribute to a wonderful character.

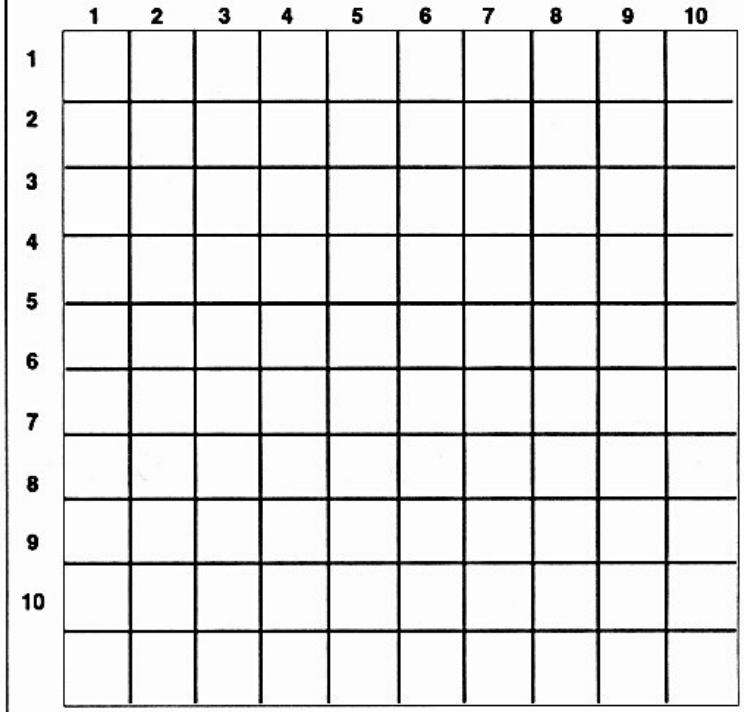
MIKE EDEN VK7ME
ar

We regret to announce the recent passing of:

Laurie Meek VK4ALZ

Morseword No 58

Solution Page 56



Across:
1 Appears
2 Frosts
3 Graded
4 Spasms
5 Mink
6 Leaves
7 Platform
8 Likeness
9 Cover
10 Old form of "have"

Down
1 Stitches
2 Run away
3 Copied
4 Large rabbit
4 Caresses
6 German boy's name
7 Nullify
8 Touch
9 Meaning
10 Bedding

Audrey Ryan 1991

ANNUAL INDEX FOR 1991

HAMADS

TRADE ADS

● AMIDON FERROMAGNETIC CORES: For LF/HF/VHF/UHF applications. Send DL size SASE for data/price to RJ & US Imports, Box 431, Kiama NSW 2533 (no enquiries at office, please... 14 Boanyo Ave, Kiama). Agencies at: Geoff Wood Electronics, Sydney; Webb Electronics, Albury; Assoc TV Service, Hobart; Electronic Components, ACT; Truscott Electronics, Melbourne.

● WEATHER FAX programs for IBM XT/ATs. RADFAX $35, is a high resolution shortwave weatherfax, morse & RTTY receiving program. Needs CGA, SSBhf radio & RADFAX decoder. Also RF2HERC, RF2EGA and RG2VGA, same as RADFAX2 but suitable for Hercules, EGA and VGA cards respectively. SATFAX $45, is a NOAA, Meteor and GMS weather satellite picture receiving program. Uses EGA or VGA modes. Needs EGA or VGA colour monitor and card & WEATHER FAX PC card, & 137MHz receiver. All programs are on 5.25" or 3.5" disks (state which) & documentation, add $3 postage. ONLY from M Delahunty, 42 Villiers St, New Farm Qld 4005. Ph (07) 35 82785.

FOR SALE — VIC

● ICOM 24AT dual band handheld extras include BP84 power pack CP12 cig lighter pack 1/4 wave telescopic antenna, top cond. $650 ono. Ted VK3TG (052) 52 3225.

● ICOM IC730 xcvr. Ideal mobile rig. With mike and manual, $750. Fred VK3APA QTHR (058) 64 6287.

● ICOM IC28H 45W 2m mobile, GC, $450 ono. Ted VK3TG (052) 59 3225.

● DUAL BAND YAGI 10/15m. Heavy duty Hidaka with balun, $100 or offer. Ron VK3OM QTHR (059) 44 3019.

● SCIENCE FAIR Globe Patrol Tandy Kit — shortwave radio Receiver. Laurie VK3DLO QTHR (053) 35 7926.

● KENWOOD TS-680 (TS-140 WITH 6MX ADDED) EC Serial no 0040109 $1400 ono 13.6v, 30 Amp continuous, metered DC heavy duty power supply $450 ono. VK3AFQ. Tel (03) 596 2414 QTHR.

● GEAR OF Russell VK3CZ (deceased). Tx Rx IC730 80m-10m (WARC), $550, complete with power supply & desk mike. FT290 2m TxRx with mike, $400. UNIDEN 2020 TxRx 80m-10m, with tuner & speaker, $450. JOHNSON VIKING RANGER Tx & power supply, as is, $100. Forest Phone 1825 kHz, as is, $45. LINEAR amp 80m-10m Barker & Williamson, $350. KINGSLEY RxAR7, $150. AR88 Rx 540KHz-32MHz, ext spkr, $150. SWR BRIDGE VG2 dual meters, $30. TILT OVER Tower, 45' approx (buyer to remove), $250. THREE-ELEMENT HF beam (buyer to remove), $125. CRO Hameg HM107-3", $25. FREQUENCY METER elect Aust, not working, $40. KEY SPEED mechanical Vibroplex, $60. SIGNAL GENERATOR Heathkit 100kHz-160MHz, $50. 8AMP power supply, $75. FREQ METER BC221-AK125-20,000kHz, $40. FREQ METER Gertsch FM-3, $30. STC VHF TxRx & 1 spare (parts), $50. ANTENNA TUNER with SWR bridge, $50. Q MULTIPLIER QF/1 Heathkit, $15. METER 30V & 300μA Gene Swedish, $25. PARABOLIC DISH 6' dia approx, $50. YAGI X Beam, not complete (VHF), $50. There are numerous other bits & pieces at reasonable prices. Items listed are on sale from the QTH of VK3GZ Saturday 18 Jan '92 from 9am-5pm. Prior enquiries to Jack VK3EB. Phone (03) 882 1769.

● TRI-AXIAL cable ASC R146 50ohm new still on cable drum 300m, $150. Bruce VK3WL. (03) 741 7654 AH, (03) 741 1127 BH.

● CASIO SKYWALKER digital watch, waterproof to 200m oval displays with circular slide rule, bezel for 1-in-60 calculations. Calculates: distance, ground speed, fuel, ETI, nautical/statute miles/kilometre conversions, USG/IMPG/litre, etc. As new. Never worn. $120. Bruce VK3WL (03) 741 7654 AH, (03) 741 1127 BH.

● The RAAF Williams Amateur Radio Club VK3APP at the Laverton Base will be conducting classes for prospective radio amateurs and those who wish to upgrade their existing qualifications during 1992. The club is planning classes in the following sequence: AOCP/NAOCP morse code; pre-novice theory preparatory course; NAOCP theory; and an AOCP theory course. Enquiries to Mr Neil Trainor (03) 369 1010.

ICOM IC730 HF txcvr 10-80m w/mic & manual, VGC, S/N 12640, $700. Kevin VK3CKL QTHR (03) 792 9503.

● YAESU FT101B tcvr, mic handbook, 4 spare finals, $400. Shure 444 mic, $50. Kyoritsu SWR meter, $25. Sangean world radio ATS803A (retails $299), $150. Arthur VK3ENT QTHR (053) 32 8184.

WANTED — NSW

● FL110 LINEAR amp. VK2FNF QTHR (06) 46 2511.

WANTED — VIC

● HQ1 or ALTRON 3-element mini beam, condition not important. Basically needed as addition to present 2-element HQ1. VK3EAZ Evan (03) 799 1140.

● ATTENTION CHESS PLAYERS. Please feel free to join Kevin, Bruce, Michael, Doug and Damian on the 80m chess net on 3.669MHz Tuesdays 0930Z. Players of all levels, beginners up, most welcome. Damian VK3EHP.

● MANUAL for Hallicrafters SX25 RX copy or original. Will reimburse costs. Bruce VK3WL 8 Walwa Place, Werribee 3030. (03) 741 1127, (03) 741 7654.

WANTED — SA

● TS600 6m txcvr or similar. Also 150w linear amp for 6m. Call Gary BH (08) 230 8032 or AH (08) 370 9196.

WANTED – WA

● RESISTORS 10 470 ohm five watt carbon please. VK6NTJ Terry QTHR.

WANTED – TAS

● YG3395C CW filter for Kenwood TS520S. Clarrie VK7HC QTHR (004) 31 8211.

Hamads

Please Note: If you are advertising items For Sale and Wanted please use a separate form for each. Include all details; eg Name, Address, Telephone Number (and STD code), on both forms. Please print copy for your Hamad as clearly as possible.
*Eight lines per issue free to all WIA members, ninth line for name and address
Commercial rates apply for non—members. Please enclose a mailing label from this magazine with your Hamad.
*Deceased Estates: The full Hamad will appear in AR, even if the ad is not fully radio equipment.
*Copy typed or in block letters to PO Box 300,
Caulfield South, Vic 3162, by the deadline as indicated on page 1 of each issue.
*QTHR means address is correct as set out in the WIA current Call Book.

*WIA policy recommends that Hamads include the serial number of all equipment offered for sale.
*Please enclose a self addressed stamped envelope if an acknowledgement is required that the Hamad has been received.
Ordinary Hamads submitted from members who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re—sold for merchandising purposes.
Conditions for commercial advertising are as follows: $25.00 for four lines, plus $2.25 per line (or part thereof) Minimum charge — $25.00 pre—payable.

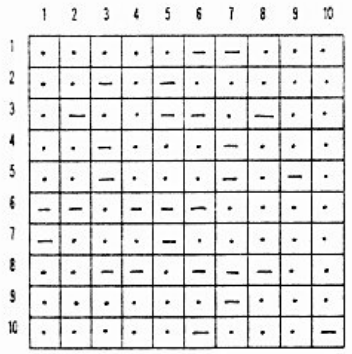
State: .....

Not for publication: ❑ Miscellaneous ❑ For Sale ❑ Wanted

Name:..... Call Sign: ..... Address: .....

Solution to Morseword No 58

Page 50



Across: 1 seems; 2 ices; 3 rated; 4 fits; 5 fur; 6 goes; 7 dais; 8 image; 9 hide; 10 hast

Down: 1 sews; 2 flee; 3 aped; 4 hare; 5 pats; 6 Kurt; 7 negate; 8 feel; 9 sense; 10 sheet

TRADE PRACTICES ACT

It is impossible for us to ensure the advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore advertisers and advertising agents will appreciate the absolute need for themselves to ensure that, the provisions of the Act are complied with **strictly.**

VICTORIAN CONSUMER AFFAIRS ACT

All advertisers are advised that advertisements containing only a PO Box number as the address cannot be accepted without the addition of the business address of the box-holder or seller of the goods.

TYPESETTING : Magazine Graphics, PO Box 72, Caulfield Sth, 3162, Ph: 528 1033

PRINTING: Industrial Printing, Richmond

MAIL DISTRIBUTION: R L Polk & Co Pty Ltd, PO Box 140, Collingwood, Vic. 3066, Tel:(03) 417 5161

ADVERTISERS INDEX JANUARY 1992

HOW TO JOIN THE WIA

Fill out the following form and send to:

The Membership Secretary
Wireless Institute of Australia
PO Box 300
Caulfield South, Vic 3162

I wish to obtain further information about the WIA.

Mr, Mrs, Miss, Ms: .....

.....

Call Sign (if applicable): .....

Address: .....

.....

.....

State and Postcode: .....

VK QSL Bureaux

The official list of VK QSL Bureaux. All are Inwards and Outwards unless otherwise stated.

VK1 GPO Box 600 Canberra ACT 2601

VK2 PO Box 73 Teralba NSW 2284

VK3 Inwards — GPO Box 757G Melbourne Vic 3001
Outwards — 40G Victory Blvd, Vic 3147

VK4 GPO Box 638 Brisbane Qld 4001

VK5 PO Box 10092 Gouger St Adelaide SA 5000

VK6 GPO Box F319 Perth WA 6001

VK7 GPO Box 371D Hobart Tas 7001

VK8 C/o H G Anderson VK8HA
Box 619 Humpty Doo NT 0836

VK9/VK0 C/o Neil Penfold VK6NE
2 Moss Court Kingsley WA 6026

WIA Divisional Bookshops

The following items are available from your Division's Bookshop
(see the WIA Division Directory on page 3 for the address of your Division

	Ref	Price to Members
ANTENNA BOOKS		
Ant. Compendium Vol 2 Software only	BX293	$18.00
Antenna Compendium Vol 1 ARRL	BX163	$19.80
Antenna Compendium Vol 2 & Software ARRL	BX294	$32.40
Antenna Compendium Vol 2 ARRL	BX292	$21.60
Antenna Handbook - Orr - 1988	BX217	$23.00
Antenna Impedance Matching - ARRL - 1989	BX257	$27.00
Antenna Note Book W1FB - ARRL - 1987	BX179	$18.00
Antenna Pattern Worksheets Pkt of 10 - ARRL	BX211	$5.40
Antennas 2nd ed John Kraus - 1988	BX259	$93.60
Beam Antenna Handbook - New ED. 1990 Orr	BX215	$23.00
Cubical Quad Antennas - Orr	BX214	$19.20
HF Antennas - Moxon RSGB - 1988	BX188	$27.00
Novice Antenna Notebook DeMaw - ARRL	BX162	$14.40
Practical Wire Antennas - RSGB	BX296	$25.20
Reflections - Software 5in disk	BX358	$18.00
Reflections - Transmission lines The Book - ARRL - 1990	BX348	$36.00
Simple Low Cost Wire Antennas	BX218	$23.00
Smith Chart Expanded Scale PK of 10	BX903	$5.90
Smith Charts S/Scale 1 Set co-ord Imp/Admir Pack of 10	BX900	$6.10
Smith Charts Stand Scale 1 SET Co-or. PK of 10	BX900	$5.90
The Antenna Handbook - ARRL1991 edition	BX370	$36.00
The Truth About CB Antennas - Orr	BX219	$23.00
Transmission Line Transformers - ARRL 2nd edition	BX329	$36.00
Vertical Antenna Handbook - Lee - 1990	BX284	$16.70
Vertical Antennas - Orr - 1988	BX220	$21.10
Yagi Antenna Design - ARRL - 1986	BX164	$27.00
ATV BOOKS		
The ATV Compendium - BATC	BX270	$14.20
The Best Of CQ-TV - BATC	BX273	$15.80
CALL BOOKS		
Radio Call Book International	BX339	$57.60
Radio Call Book North America	BX338	$57.60
FICTION		
CQ Brings Danger - ARRL	BX206	$9.40
CQ Ghost Ship - ARRL	BX204	$9.40
Death Valley QTH - ARRL	BX205	$9.40
Grand Canyon QSO - ARRL	BX207	$9.40
Murder By QRM - ARRL	BX208	$9.40
SOS At Midnight - ARRL	BX209	$9.40
HANDBOOOKS		
ARRL Handbook – 1991	BX337	$47.60
ARRL Handbook – 1992	BX369	$47.60
Electronics Data Book - ARRL - 1988	BX201	$21.60
Motorola RF Device Data - 2 Volumes	BX047	$22.10
Radio Communication Handbook - RSGB	BX266	$50.40
Radio Data Reference Book - RSGB - 1985	BX189	$32.40
Radio Handbook 23rd edition - Bill Orr	BX224	$53.90
Radio Theory For Amateur Operators - Swainston - 1991	BX265	$38.70
HISTORY		
200 Meters and Down 1936 - ARRL	BX198	$7.20
50 Years of the ARRL - 1981	BX196	$7.20
Big Ear - Autobiography Of John Kraus W8JK - 1976	BX363	$11.30
Golden Classics of Yesterday - Ingram	MFJ30	$18.50
Spark to Space - ARRL 75th Anniversary - 1990	BX310	$36.00
INTERFERENCE BOOKS		
Interference Handbook - Nelson - 1989	BX181	$21.10
Radio Frequency Interference - ARRL	BX186	$8.60
MISCELLANEOUS		
Amidon Ferrite Complete Data Book	BX044	$5.90
Design Notebook W1FR - ARRL	BX357	$18.00
Help For New Hams DeMaw - ARRL	BX308	$18.00
Hints and Kinks 12th edition - ARRL	BX330	$14.40
Novice Notes, The Book - ARRL OST	BX298	$10.80
QRP Classics - ARRL OST	BX323	$21.60
QRP Note Book - DeMaw ARRL	BX170	$10.80
Radio Astronomy 2nd edition - John D Kraus	BX262	$71.90
Shortwave Receivers Past and Present	BX253	$15.80
Solid State Design - DeMaw ARRL	BX171	$21.60
MORSE CODE		
Advanced Morse Tutor - 3.5 inch Disk	BX328	$36.00
Advanced Morse Tutor - 5.25 inch Disk	BX328	$36.00
Morse Code 2 Tapes Novice Code Course - Gordon West	BX228	$17.90
Morse Code 6 Tapes 13-20 WPM Code Course - Gordon West	BX231	$63.90
Morse Code 6 Tapes 5-13 WPM Code Course - Gordon West	BX230	$63.90
Morse Code 6 Tapes Novice Code Course - Gordon West	BX229	$63.90

	Ref	Price to Members
MORSE CODE (Contd)		
Morse Code Tapes Set 1: 5-10 WPM - ARRL	BX331	$16.70
Morse Code Tapes Set 2: 10-15 WPM - ARRL	BX332	$16.70
Morse Code Tapes Set 3: 15-22 WPM - ARRL	BX333	$16.70
Morse Code Tapes Set 4: 13-14 WPM - ARRL	BX334	$16.70
Morse Tutor 5.25 inch IBM Disk	BX187	$16.70
OPERATING		
Amateur Radio Awards Book - RSGB	BX297	$27.00
DXCC Companion	BX345	$10.80
Low Band DXing - John Devoldere	BX195	$18.00
Maidenhead Locator-Grid Atlas - ARRL	BX197	$9.00
Operating Manual - ARRL - 1990 3rd Edition	BX192	$27.00
Operating Manual - RSGB - 1985 3rd Edition	BX359	$25.20
Passport to World Band Radio 1991	BX346	$30.60
Prefix Map - The World Flat on Heavy Paper	BX335	$14.40
Prefix Map of North America	BX235	$7.20
Prefix Map of The World	BX234	$7.20
Radio Amateurs World Map	BX236	$7.20
Short Wave Propagation Handbook	BX268	$16.70
The Complete DXer - Bob Locher - 1989	BX194	$18.00
Transmitter Hunting - TAB - 1987	BX222	$32.30
PACKET RADIO BOOKS		
AX.25 Link Layer Protocol - ARRL	BX178	$14.40
Computer Networking Con (Packet) No 5 1986 - ARRL	BX167	$18.00
Computer Networking Con (Packet) No 6 1987 - ARRL	BX168	$18.00
Computer Networking Con (Packet) No 7 1988 - ARRL	BX184	$22.50
Computer Networking Con (Packet) No 8 1989 - ARRL	BX295	$21.60
Computer Networking Con (Packet) No 9 1990 - ARRL	BX360	$21.60
Computer Networking Conf (Packet) 1-4 1982/5	BX166	$32.40
Gateway to Packet Radio 2nd edition - ARRL	BX169	$21.60
Packet Radio Made Easy - Rogers	MFJ32	$18.50
Packet Users Notebook - Rogers	BX285	$16.70
SATELLITE BOOKS		
Oscar Satellite Review - Ingram	MFJ31	$15.30
Satellite AMSAT-NA 5th Symposium 1987 - ARRL	BX182	$15.80
Satellite AMSAT-NA 6th Symposium - ARRL	BX199	$15.80
Satellite Anthology - ARRL	BX180	$14.40
Satellite Experimenters Handbook 1990 edition	BX177	$36.00
Space Almanac – ARRL – 1990	BX299	$36.00
Weather Satellite Handbook - ARRL	BX324	$36.00
Weather Satellite Handbook Software only - ARRL	BX326	$18.00
VHF/UHF/MICROWAVE		
All About VHF Amateur Radio - Orr - 1988	BX216	$23.00
Microwave Handbook Vol 1 - RSGB - 1989	BX318	$63.00
Microwave Update Con. 1987 - ARRL	BX174	$15.80
Microwave Update Con. 1988 - ARRL	BX183	$15.80
Microwave Update Con. 1989 - ARRL	BX321	$21.60
Mid Atlantic VHF Con. October 1987 - ARRL	BX175	$15.80
Spread Spectrum Source Book - ARRL - 1991	BX365	$36.00
UHF Compendium Part 1 & 2 Vol 1	BX250	$67.50
UHF Compendium Part 3 & 4 Vol 2	BX251	$67.50
UHF Compendium Part 5 German Only	BX354	$50.20
UHF/Microwave Experimenters Manual - ARRL - 1990	BX325	$40.50
UHF/Microwave Experimenters Software 5 inch Disk - ARRL	BX327	$18.00
VHF 21st Central States Con. 1987 - ARRL	BX172	$15.80
VHF 22nd Central States Con. 1988 - ARRL	BX173	$15.80
VHF 23rd Central States Con. 1989 - ARRL	BX286	$15.80
VHF 24th Central States Con. 1990 - ARRL	BX322	$21.60
VHF/UHF Manual - RSGB	BX267	$43.20
WIA MEMBERS SUNDRIES		
Log Book Covers		$16.00
WIA Badge - Diamond		$4.00
WIA Badge - Diamond With Call Sign Space		$4.00
WIA Badge - Traditional Blue		$4.00
WIA Badge - Traditional Red		$4.00
WIA Car Window Stickers		$0.50
WIA Tape - Sounds of Amateur Radio		$7.00
WIA PUBLICATIONS		
Australian Radio Amateur Call Book - 1992		$10.00
Band Plans Booklet		$2.80
WIA Log Book - Horizontal or Vertical Format		$5.00
WIA Novice Study Guide		$1.50

Not all items above are available from all Divisions (and none is available from the Executive Office).
If the item is carried by your Divisional Bookshop, but is not in stock, your order will be taken and filled as soon as practicable.
All prices are for WIA members only – postage and packing, if applicable, is extra.
All orders must be accompanied by a remittance.

ICOM

Count on us!

IC-765

Our Base Units Have So Many Features, These Pictures Speak Louder Than Words.

IC-781

Our features speak volumes.

Rather than write hundreds of words to introduce our range of base units, we'd like you to phone us free on (008) 338 915.

We'll provide you with detailed brochures and the name of your nearest authorised Icom dealer.

Alternatively, you can write to Reply Paid 1009 Icom Australia Pty Ltd P.O. Box 1162 Windsor Victoria 3181.

Telephone (03) 529 7582 A.C.N. 006 092 575

L.L. Brown Advertising 3909